STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

IN RE: :
CLEAN AIR COUNCIL :
PUBLIC HEARING :
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Transcript of proceedings taken at the Department of Environmental Protection, Public Hearing Room, 1st Floor, 401 East State Street, Trenton, New Jersey, on Wednesday, April 1, 2009, commencing at 9:49 a.m.

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3

SETTING THE STAGE

SETTING THE STAGE (Cont'd)

REVIEW OF ALTERNATIVES

REVIEW OF ALTERNATIVES (Cont'd)

IDENTIFYING SOLUTIONS

Public Speakers

Final Comment

(Clean Air Council Public Hearing already in progress.)

VICE CHAIR HANNA: With that, I would like the to get things started.

I am pleased to introduce a 28-year veteran of New Jersey DEP, spanning such important issues as global warming, sea level rise, renewable energy, flood control, storm water management, natural resource protection, storm preparedness and ecological sustainability.

Please, welcome the smiling face that greets you on the DEP home page, Commissioner Mark Mauriello.

Thank you.

ACTING COMMISSIONER MAURIELLO: Thanks, Toby.

An interesting crowd today. I was looking at the roster last night and I thought, I do a lot of these events. I go out and speak to a group that might all be a particular constituency group. This is quite a diverse group here. I think it really reflects the reality of this kind of work that the Council has to do. It's not just all

about air and that's kind of why, I guess, it's exciting when people get involved and actually dedicated to this work.

The more that we look at the things that various groups at DEP focus on, the more you see that it's all really related. I was at a land rally recently and the speaker made a statement, a quote from John Muir, who was a great naturalist and basically said that everything is connected to something else or some simple thing like that. I'm not as articulate, but the point was true. In the context of land conservation, it was true and in the context of this work, certainly it's true.

So I want to thank you, first, for doing all the work that you do. It is important that we have the resource in the form of the Council to help us with questions and policy and to make sure that we're hearing from a broad group of folks and not just the great, smart people that work here at DEP;

that was for all you folks back there.

Now, the issues and I went through the agenda for today and it's really

impressive, not just in the people themselves who are here, but the topics and it kind of boils down to three critical areas; air quality, climate change and energy supply, all obviously interrelated.

I'm spending a lot of time lately with Nancy Wittenberg and Bill O'Sullivan and staff on the air issues. It's an area where admittedly my learning curve is very steep, but I also find it because it's a steep curve very, very interesting and challenging and the work that is going on in the Department in this area is quite impressive with the state implementation plans and looking at the nonattainment, how to deal with that. It really -- it's a high -- high on everybody's radar.

You probably saw it just a couple of days ago, Former Commissioner Ed Kearney (ph) and EPA administrator, Lisa Jackson were up in Port Elizabeth doing a press conference talking about buffer zones around the coast to try to mitigate the impact of emissions on the port areas resulting from ocean-going ships. It's pretty daunting to think of the targets

11

for the reductions, not unlike the daunting targets of the Global Warming Response Act that we're trying to implement here in New Jersey with everybody's help.

The interrelationship, as I said, with the energy supply to those emission issues is key. You have the traditional energy sources, which are all important contributors to providing for the demand in New Jersey. What the future holds in terms of that portfolio and how various sectors may increase or decrease I think remains to be seen and a lot of that will be dependent on the work that is going to happen with the Council and the advice and the recommendations that you can put forth to the Department.

In terms of climate change, which, actually, I have spent a lot of time in my career working on, not from the emissions standpoint, but from a sea level rise and coastal hazard standpoint, a very exciting time.

Obviously, I mentioned the Global Warming Response Act. It has very ambitious targets for greenhouse gas reductions in the

12

2020 and 2050 period and how we actually get there is obviously the challenge. Jeanne Herb and her staff have spent a lot of time in developing the Greenhouse Gas Action Report. They did a number of stakeholder meetings. And I know the feedback that they got through that process was very productive and will help refine specific recommendations.

I think, the last I heard, the report is due, the final report out in about a month and hopefully that is still on track; but that's important because a lot of folks looked at the Act and said, Boy, how is it ever going to happen, how will we ever get there. And the Devil is always in the details of what those measures will be that will get us there.

The reduction essentially we expect will be realized through three different means; the Energy Master Plan implementation, which is another very comprehensive plan that looks at all issues from demand reduction to increase in supply, moving toward renewables. There is a lot of work going on in that area throughout the

State.

We do a lot of meetings with folks who are interested in installing solar rays at various locations. We're trying to marry those sitings up with other problem areas like municipal landfills that we have concerns with, with other types of development to see if we can find productive uses there.

There is a lot of work going on with hydropower, both ocean and inlet kind of hydropower, as well as some interesting ideas of reusing old quarries up in the northwestern part of the State to generate some hydropower.

Obviously, wind will be a big part of transition to the renewable world. Right now, we are pretty close to having a number of environmental studies for the off-shore region completed. I believe the schedule is by the end of the summer or early fall. And folks are already lined up and we fully expect to see some permit applications for a wind farm off of South Jersey.

We get lots of inquiries from communities who want to install turbines in their communities. It is not generating huge

amounts of power, but generating enough power and being a strong symbol to the communities, that even small-scale turbines generating a little power can make a difference.

It raises challenges for us because we often regulate a lot of these because they are sitting on a wetlands edge or a beach or a plot for some other area. We try to make sure we can accommodate these in a manner that doesn't compromise or impact the environment. So you have the whole Energy Master Plan as one of the key components of meeting those greenhouse gas reductions.

The second component is a move towards low-emission vehicles, which is just at matter of time. There are a lot of discussions with BPU and DOT on how we can collaborate to ensure that the infrastructure is there so when the market does shift we have convenient operating opportunities and places to charge whether there are park and rides or there are parking lots in workplaces and things like that. There is a lot of opportunity and a lot of need for continued collaboration.

So between that, and last, but not least, the third component to meeting those goals is the Regional and Greenhouse Gas Initiative. Again, very active. And I see folks in the room. Chris Sherry (ph), who really has done amazing work representing us with that group.

New Jersey has participated in two of the cap and trade auctions, most recently within the past two weeks. I believe the general revenue total for the two auctions is on the order of I think $35 million or so, which is significant because when you establish specific recommendations for how to meet targets and reduce greenhouse gas, there is a cost to it.

The logical question is: How the heck do you pay for all these great ideas and to have programs that complement each other; and in this case, the RGGI program, which actually generates revenue for the State of New Jersey that is dedicated specifically to greenhouse gas reduction. It's really a great opportunity. The revenue is split between three agencies. The EPA gets 60 percent, BPU

16

gets 20 percent, DEP gets 20 percent for a wide range of actions from energy efficiency, renewable development, ratepayer relief, in some cases barge stewardship (ph) and a large part of the DEP fund is to help maintain and improve forest health for the purpose of carbon sequestration.

So there is a lot going on. And a lot of this, it is not just a matter of having clean air for the sake of clean air, a lot of this is it is human health that is at risk in a lot of areas in the State. It is a serious concern in terms of what air quality means to people's ability to enjoy their lives.

The renewable, there is a tremendous opportunity for increase in employment and jobs and new kinds of infrastructure that will get folks back to work. And right now, obviously, it's a big part of what all government agencies are looking to do, a big part of the federal stimulus bill, which does have some significant monetary pieces to support the renewable effort and green infrastructure. It's about getting people back to work.

So it's a health issue and there are environmental impacts that result from the quality of the air. There are opportunities for good jobs and green jobs. The key is really trying to look at, at all these various components and that's where I think the Council can be helpful in advising us and making sure that we're connected.

There is a tremendous gap and opportunity between the land use and the transportation concepts of the State. We don't traditionally do a good job of linking our land use and our transportation planning to a point where we're making smart decisions as a state to try to ensure that we're growing in the right places and we're not creating more need for people to get in their cars and travel and that's something that having been on the land use side for a long time, it is not a proud thing to have to admit, but it's a reality. We operate often in our worlds of land use or transportation or air and unfortunately we miss opportunities sometimes to really do a better job collectively on moving some big important goals forward.

18

So these types of councils, whether it's -- and I just met with the Clean Water Council a few weeks ago. There are a whole host of water issues that can be stovepiped, but we can't let that happen and that's kind of why these councils I think are really important, in that you have the ability to sort of step back. And we're all doing our day-to-day work and feeling a little bit stressed because there is a lot of that work and never enough resources. It's helpful to have the Council to help sort out the priorities and to help keep us focused and make sure we're not missing opportunities to interconnect with other groups.

So I guess I would just like to say you have a great agenda. I'm very impressed with the speakers. I want to reiterate how important your work is to the Department and to the State of New Jersey really because we all have an obligation to try to make this state a better place whether it is just to help in making sure our energy policy in the future represents the broad portfolio which currently is New Jersey. It's

a number of things. It's coal. It's nuclear. It's moving to renewables. And we're going to need help figuring out what the future energy picture looks like with particular emphasis on protecting the quality of the air for the people in the State.

So with that, again, thanks very much for your work. I will be getting reports out as a result of the meeting. I want to just, again, send out my kudos to Nancy Wittenberg and Bill and Chris Somey (ph) and that whole crew on the air side and Jeanne Herb, what she is doing with her climate office, Marjorie Kushiari (ph).

A lot of work is going on here and it's a kind of exciting even though we're all stressed and overworked to be involved in not just what is a popular thing, but a really important thing and certainly something that's time has come and it's long overdue. It's good to see the pieces falling into place.

And, again, I appreciate and welcome the input of the Council as we try to wrestle with this.
Thank you very much and thanks to

all of you. Have a great day and enjoy your session.
VICE CHAIR HANNA: Thanks, Commissioner Mauriello and thank you for all the help you provide to the Council and through your department, as well.
(Mark Mauriello was excused.)
VICE CHAIR HANNA: I want to introduce now Dr. Leonard Bielory, who is the Chair of the Clean Air Council and my colleague here.
Dr. Bielory is going to speak briefly. The first number of speakers this morning are mainly for background and setting the stage on topics that I think we'll all need to get input broadly on. And we thought it would be helpful to kick off really the public health side of climate change, in particular. And Dr. Bielory is studying this. And coming from the medical-doctor side, we thought it would be very helpful to have him kick us off.
Dr. Bielory is a doctor on staff at UMDNJ, he's a former Lehigh alum, as I am,

so I have to mention that.

Welcome, Dr. Bielory. I thank you for talking to us.

CHAIRMAN BIELORY: Thank you very much for coming. It is important, as Irwin has given a history of the New Jersey Department of Environmental Protection, it's actually a branch off the Department of Health because environment has an impact on public health and as such, the Council has one physician, that's me.

I will try to maintain a direction of the impact on public health when we talk about some of what I've learned and the learning curve, the alphabet soup of the NJDEP, which is continuous. I've been on it for a number years and continue to find new alphabets that I don't even know.

Nonetheless, it's important to reflect and I will be up front that if we're not part of the solution, we're part of the problem. It's a human issue. We have the ability to change the future and that's what we're here for, to understand the perspective of what impact we can have.

Next slide, please.

While everybody has seen climate change and they think about, you know, the polar bears or seals stranded on ice caps, but where it is coming from is the impact of ourselves, the human factor. There are other, nonhuman factors, but nonetheless, predominantly human factors have an impact.

As such, this is Time magazine. You know, if you are a polar bear, you might not be the only threatened species, but it is threatening our health. And this is Time magazine. Be worried, be very worried. It's not just the polar bear that is going to have a health problem and diminishment of numbers. It is going to be quality of life and actually quantity of life. There will be an increase in mortality, where it has already been.

As such, the climate change and the air pollution have to a large extent a common quality. We've all heard of emissions and, quote, unquote, fossil fuel we are burning.

As such, clean energy, the focus of today's, quote, unquote, Clean Air Council meeting is of major importance to reflect upon

it. Combustion of fuel, people know about the variety of CO2 methane and nitrous oxide that comes off, you know, the greenhouse gas accumulates.

There are a variety of things that are occurring. It's not just -- I've heard terms, what you call global warming. Warming is a single dimension. It's temperature. We have climate change. It is an impact not in one domain, but in multiple directions that have an impact on our health; increased temperature only being one and ozone formation.

As such, people will see numbers. I'll give you the sources for the website for the material background. Clearly, CO2 is going up in the lower right-hand corner. The temperature has been going up. And if you take a map of the world from 1984 to 2006, there are temperature changes in degrees, maybe fragments, but over a mere 20 years, we have fragment changes of degrees.

I'll give you a little bit more specifics.

As such, we have the earth average

surface temperature. And over the years 1860 to 2100, it is a small bend of historical change, very small, but something happens.

Now, the Industrial revolution

occurred here, historically. And actually, it is interesting. Allergies never -- there is one report in hieroglyphics of an Egyptian pharaoh being stung by a bee and dying of anaphylaxis. So we have intermittent cases of disease related to allergies and asthma.

However, the British Society, the Royal Society of Medicine writes a letter to the French at this point in time saying we're starting to see a stevis catharis (ph); summertime runny nose and watery eyes. The French say, as I don't know, many of you might have seen Monty Python where, you know, You British don't know what you're talking about or something like that. And as such, the letter says, We don't know what you're talking about because in France the Industrial revolution doesn't occur until about 20 to 30 years later. And as such, quote, unquote, that was, quote, unquote, ragweed allergy or the allergy symptoms that started to occur in

25

England at the time of the Industrial revolution.

Within that time, in estimates, this change in temperature only to 2000 will continue. And this is an average. The broad bend is actually the range. And so even if we stop everything now, for the next 100 years, the earth will continue to warm. Even if we stop with zero activities at this point in time, this trend will continue.

So how do we make changes?

Hopefully today you will hear a couple of points about it.

Mortality.

Temperature, okay, it's going to get a little warmer, take off a jacket. However, the southern hemispheres are going to have or are already having increased mortality. It will migrate north.

In fact, I was just given a little slip this morning about kidney stones in the southern, quote, unquote, the southern belt of the United States. As temperature rises, dehydration increases. As dehydration increases, one out of ten sitting here in this

26

room will have a kidney stone in their life. If you want to describe pain from a kidney stone, it's the oldest description, the description of giving birth, take your lower lip and pull it over your head; that's a description.

Next slide.

Climate change has an effect on health in a variety of domains, not just where I'm -- my expertise, which is respiratory, but urban heat items, heat stress, heart and respiratory failure, air pollution, increased asthma, COPD and allergies.

Vector-borne diseases. When you have more water, you have growth of certain parasites. Malaria, encephalitis, water-borne diseases. You can have cholera problems. Water resources, food supply.

With a climate change, you will have a variety of domains. The Gates Foundation (ph) is primarily focusing on infectious diseases that are looked upon as an impact of climate change, like tuberculosis, HIV and infections like Malaria; in general, worldwide vector-borne diseases.

27

Well, there are increased numbers of deaths and there is increased morbidity. Morbidity and mortality are linked. You'll hear these terms all the time in the Department of Health and Senior Services.

What is the importance?

Well, there is an end of life and there is a quality of life; so quantity and quality is very important.

And, as such, when we talk about increased mortality, increased morbidity will actually occur over time because, as an example, this is a model of a submission we put into the EPA. You have human activities, the CO2 goes up, the temperature goes up. Just a simple concept, a pollen season will change. The onset, it's occurring earlier and earlier over the past 50 years.

The question is can we predict over the next 50 years. And it looks like it will continue to process.

Will the allergy content increase?

There are CO2 studies done by the US FDA and they actually show increased pollen grains per plant of ragweed with increases in

28

CO2. This was down in the Washington, D.C. area, actually, in Maryland in their plant chambers.

Exposure to pollen, sensitivization to allergies, this is the normal trend, but we're going to get increased severity and increased frequency just with asthma and allergies, which is my domain; that's the perspective I'm showing here.

But overall, it's not just asthma and allergies, which is obviously my expertise. It is from cardial vascular disease, heart failure, cerebral vascular disease. There was a publication put out in stroke, that we've been seeing increased numbers of stroke. And it appears to be directly correlated to environment, not just the environment of McDonalds or Burger King, but what air we breathe.

The inflammatory nature. There are studies done at YOSHI (ph), Dr. Zhang is on the panel, the impact of inflammatory diseases that may be caused by this so it is not just what you eat. It's what you breathe. It's very important.

The next slide.

While this is the cover of nature of a major scientific journal -- well, all of the journals reflect it. Time magazine is not your major scientific journal, but on the other hand, it is a good publicity journal. But it's clear, the severity and duration of summertime regional pollution episodes are projected to increase, but they have been increased. And if you look, by 2050, increase by 58 percent of red ozone alert days; not minor, major.

The next slide.

Again, what will ozone particulate matter?

This is just a percentage published in 2006. Just a change in 5 parts per billion of ozone will lead to an increase, quote, unquote, of change of respiratory hospital admissions. This is not mortality. This is morbidity; meaning, you have to go to the hospital.

The next slide.

Hospital admissions/mortality.

Again, the point is here,

respiratory is on there, cardiovascular. These are areas of interest of mine and it's very solid. Like I said, kidney stones we're going to hear about where all of them are in the mix of the solution of or suspension of particulate matter that we breathe.

The next slide.

Can we make a difference?

Can we make a change?

If we don't, again, as I stated, if you're not part of the solution, you're part of the problem. With mitigation efforts started now or should have started 50 years ago, there are projections that we can make a difference.

And, in fact, a study that the, quote, Council has heard just recently, there was a study that there are improvements on the way, but it's not enough.

This could be your grandfather, your father or I'll tell you more important, your grandchild, who is going to grow up breathing material that we leave, our footprints today. Our footprint is a bioprint of health for the future.

You can actually change that. There are a variety of variables with a certain mitigation structure and certain modeling has occurred and certain data is now supporting that. We must act now for the future.

The next slide.

As such, is this the solution?

Again, there is more evidence, here is more evidence that human activity is, quote, global warming. If that doesn't, no more activity. We're just stopping everything.

So I thank you. I thank you for all coming and I would like to continue on time, as I've tried to see that -- I am supposed to speak until 15 minutes after the hour and I am finished.

Thank you.

VICE CHAIR HANNA: Thank you, Dr. Bielory.

Does the Council have questions for Len?

CHAIRMAN BIELORY: Oh, that I didn't expect.

No questions.
VICE CHAIR HANNA: None today.
Thank you, Dr. Bielory.
(Leonard Bielory, M.D. was excused.)
VICE CHAIR HANNA: We do have a problem on the agenda already, Assemblyman Chivukula is apparently stuck in traffic. He is not here, yet.
Commissioner Asselta, would you be willing to...
COMMISSIONER ASSELTA: Absolutely.
VICE CHAIR HANNA: A quick introduction for Commissioner Asselta.
Commissioner Nicholas Asselta has a long career in public service serving terms in both the General Assembly and the Senate and now is one of the commissioners for the New Jersey Board of Public Utilities. And we certainly welcome the BPU. They've got a very big role in this and have been working years ahead of this Council's work on energy and these matters.
We're certainly interested in hearing your testimony. Thank you very much

for coming.

COMMISSIONER ASSELTA: Thank you, Vice Chairman and thank you for inviting me and including the BPU in these very important discussions.

Once again, I know the commissioner mentioned the great job and important job that you do on a volunteer basis to make sure our state is the healthiest state in the nation.

All I know is I came here this morning with a huge sinus problem, an allergy problem. And, Doctor, after looking at those slides, I think I've gotten worse here so I'm going to need your help. And I've got a pain in my back. Hopefully, it's not a kidney stone.

CHAIRMAN BIELORY: Take two aspirins, go to bed and call me in the morning.

COMMISSIONER ASSELTA: But seriously, thank you on behalf of President Bachs (ph) and my fellow commissioners. Thank you for the partnership I think we have with you and your council, all

34

the members here and the general public out there.

It's ironic that the

commissioner's remarks were pretty much hand in glove and indicative of the relationship that the BPU has with the DEP and not so much just personnel because if you look at the profiles and the board president and some of the other members, the relationship is there. It has been there historically; but most importantly, the job that the DEP does and the job that the BPU does in this very important issue, clean air, clean water and our existence for energy in the future is tied together very, very tightly and securely.

The commissioner mentioned some of the remarks I was going to make about our clean energy program, which the DEP is very helpful with us and continues to work closely with us. The commissioner mentioned as importantly, our solar program is No. 2 in the nation. I think all of us should be proud of that.

Keep in mind that all of these programs that the BPU has created over the

35

last few years have been the direct result of energy deregulation and a charge on everyone's energy bill that helps us get some of those resources together and create programs just like this, like the solar program.

Let me just briefly talk about

that because it has an impact and it's growing. Over 3300 installations around the state and growing. There's a new program we have just created called the ASTERISK (ph) program moving away from rebate to help homeowners, business owners and commercial/industrial get a pay back not only on the systems that they install, but long term get a paycheck in the mail from an energy company if they produce more energy than they currently don't need in that business, in that home. And that program is nationwide, one of the first and we're at the cutting edge, the BPU and the State of New Jersey in developing that ASTERISK (ph) program and our solar program in general.

I would like to see just as a side bar more and more commercial and industrial use of solar. And I think the BPU is now

36

moving to encouraging larger installations that can make even a greater impact on our total consumption and usage for the future.

When you drive up the turnpike, which I do just about everyday, you can't help but see the hundreds of thousands of square feet of warehousing space that is just so conducive to solar application. And our job at the BPU is to meet and try to encourage some of those, some of those installations to utilize that.

Another issue I would like to speak about, also, is our state facilities and, you know, the State has been promoting this program for over seven or eight years and I think the State now needs to move into the direction of trying to fit and retrofit some of our state facilities with solar and wind applications.

I think we owe it to -- we owe it to the taxpayers in New Jersey. And most importantly, we have to kind of walk the walk like everybody else is doing here. And I look forward to working with my other members and other commissioners to move forward on some of

37

those installations in really facilities that are just perfect for that.

Down in my area, down in Cumberland County, we have three state prison facilities that are perfect, perfect for the application of solar or wind down there. And this is what the BPU I think and hope with the proper priorities will move towards helping our state, also, participate in renewable generation.

Wind, and I know the commissioner mentioned about wind and we're at the very beginning stages, but we have selected the first large wind arm participant; and that is, PSE&G, which will be about 19 miles off the coast of New Jersey and will produce somewhere between 200 and 400 megawatts.

This is significant. If you look at a map and look at all the proposed off-wind installations, New Jersey is ahead of everyone else in the United States.

And as the commissioner mentioned, we hope within a year, once we gather that data out there, we will begin the permitting, construction process to move that forward.

38

Once again, another alternative. And I know your theme here is electricity generation alternatives. Believe me, that is a large alternative, along with solar.

A couple of other issues that I think you need to know and members here are intimately involved in businesses and understand the challenges that most businesses have in the future.

We have created a demand response program now for businesses and we'll infiltrate and try to incentivize the program to help businesses look at their production levels and move away from using their facilities in high density use time periods during the day.

Think about those concentrated efforts when a factory is running, when every factory in the State of New Jersey is running and every air conditioner is running. At certain parts of the day, we have calculated and done data research to find out when those times are. And if businesses can readjust their schedule without losing productivity, mind you, and they can move away from using

that high demand at those particular times, we will produce incentives for those businesses to do that, which then, again, adds to our supply when we need it.

Energy efficiency, EE, which is a very big issue for BPU now. And we have partnered with every electric utility in the State to come up with plans on how they are going to communicate to their customers some of the very easy alternatives in your own household in how to save energy.

EE is so important. I think if all of us in this room think about your home and how you waste electricity. And I can only think in my house where sometimes I'll come home and there will be three TVs on in each room of my house and nobody will be in those rooms and it just drives me crazy. Those are the kinds of little things -- and, obviously, some of the electric application in your home, some of your appliances that need to be updated, these are the kinds of things BPU are encouraging people to do, giving rebates to purchase a new dishwasher, you'll get a rebate back to help offset that cost of that

energy-efficient appliance. These are the things that your money and I keep emphasizing it, the money that you pay on your electric bill goes to, to help that demand and supply be in synch.

I know my charge today was to talk about where do businesses go and what holds -- what in the future businesses hold here. I think the Council here has to come up with a report that does that balancing act. We know how difficult the economy is in the United States of America and the State of New Jersey and how harmful certain regulatory positions could be for businesses and in a very bad time.

I think this council, just like the BPU does, we try to balance that and make sure that citizens and ratepayers are protected, yet we're still trying to promote economic development in a responsible way; that is such a very important charge that you

have that we are confident at the BPU you're going to come up with.
I can only tell you and I know the commissioner mentioned some of the other --

excuse me, it is the allergy talking. I am going to need your business card afterwards.
CHAIRMAN BIELORY: I accept Visa and Master Card.
COMMISSIONER ASSELTA: Okay.
I think the commissioner was on point on alternatives. We are doing renewables. Our goal in 2030 is to have 30 percent of New Jersey's needs overall done with renewables.
Is that a lofty goal?
Absolutely, but we want to set high goals. If we get to 20 percent, if we get to 15 percent, that other 80 percent or 85 percent or 70 percent still has to be produced.
Will the demand go up?
Absolutely, even though our economic situation does not point to that, just looking in my little region there in Atlantic and Cumberland County where three new casinos were proposed, one was being built and everything got stalled, an example of projected energy use and consumption now has

stalled; that doesn't mean in the next three

to five to ten years New Jersey won't continue to increase its need.

The commissioner remarks.

Renewables, natural gas and L&Gs (ph) off the coast I think are reality down the road here. Storing energy will always be the technology involved and trying to store electricity that is produced and not used is going to be key technology in the future in my opinion.

We're always going to be reliant on, obviously, coal plants in Ohio and Pennsylvania because our PJM grid purchases that power and distributes it to New Jersey. We do not produce all our electricity here. Our major producer and 51 percent of the electricity produced for New Jerseyans is produced by our three nuclear plants in New Jersey, 51 percent.

I just read this morning, Oyster Creek is up for an evaluation today. And whether it will be approved or not, I can just tell you if Oyster Creek does not get reapproved and reauthorized, we will have a demand problem there. We're going to have to make that up somewhere if Oyster Creek doesn't keep producing electricity for the citizens of New Jersey.

I'm not sitting here promoting nuclear energy. I am just telling you where the alternatives are and the facts of it.

The Salem plant has one more available pad site to build one more reactor, which could then offset some of the other needs in the very near future, three to five years out, ten years out, whether that is something that citizens of New Jersey want will be up for debate and whoever is governor at that point in time, whoever is president of the United States at that particular time will play a role in that because the cost of one more reactor in Salem County will be somewhere around 10 billion to build and it will take 10 years to build. It will provide 4,000 jobs annually for 10 years and those are hard facts there, but they are some of the alternatives we face, some of the solutions we face in New Jersey.

We're hoping all these factors continue to -- technology continues to grow so

that these particular alternatives are as efficient and as environmentally sensitive to our state as possible and that is our charge to BPU.

I will take a few questions, Mr. Vice Chairman, if you would like.

VICE CHAIR HANNA: Thank you, commissioner. You're right on time I appreciate that.

COMMISSIONER ASSELTA: Thank you.

VICE CHAIR HANNA: I did have one or two questions and I will let the Council ask as well, let me just take one.

COMMISSIONER ASSELTA: Yes.

VICE CHAIR HANNA: You mentioned demand response incentives, trying to get industry or large users to adjust their schedules so there is not so much demand on peak hours.

COMMISSIONER ASSELTA: Peak hours, right.

VICE CHAIR HANNA: Can you give us some more information about that or can you provide it now or later?

COMMISSIONER ASSELTA: We're

looking at June in rolling out the program so very shortly, within the next month or so we'll have a detailed plan on those incentives and we'll be happy to provide the Council with that information as soon as we have it locked in and available.

VICE CHAIR HANNA: I know there has been a lot of incentives offered through PJM and other utilities on demand reduction, demand side response, but this is something new that will be coming out in the coming months?

COMMISSIONER ASSELTA: And the incentive is going to be really critical because you can imagine a facility that produces x widgets at a particular time to try to get them to readjust their production schedules, readjust their labor schedules and still meet the demand of the market place on time is going to be very, very difficult and we understand that.

Incentives are going to have to play a huge role in encouraging those companies to move forward with that.

VICE CHAIR HANNA: Right, great.

Thank you.

MR. SPATOLA: Commissioner, I just want to ask if there are any working groups currently underway between the board and the private sector of New Jersey, in terms of all these plans or programs that you outlined today.

COMMISSIONER ASSELTA: We have many stakeholders in all these particular initiatives and meetings are ongoing with our broad staff. Large energy users in New Jersey have their own association. They have their own executive director, who we meet with on a continual basis. So they are well aware of what we're doing and playing a role in that as a stakeholder; a very good question.

Thank you.

DR. BLANDO: I've been left with the impression that the demand for rebate programs like the ASTERISK (ph) programs sort of outstrips the supply of money in those funds. And I was curious if you foresee the economic stimulus program at the federal level, how that will impact the clean energy program.

COMMISSIONER ASSELTA: Well, the economic stimulus package is still kind of being debated inside the BPU with the commissioners and the staff. We project to get about $77 million over about three years. Each of us have our own kind of vision and priority.

I can't speak for the other four members. I know what I would do with that money, quite frankly, and I mentioned earlier in my remarks, I believe the State of New Jersey has to set an example with state facilities. I think the argument is you could split up $77 million in 30 different ways and maybe have an impact, maybe not; or, you could spend $77 million on one initiative and absolutely be sure that you make an impact and that's kind of where I'm leaning, but I'm one of five members and that's what democracy is all about and we'll continue to debate that issue.

I would venture to say that $77 million is going to be probably put in a lot of different programs to enhance them, whether it's solar, whatever, renewables

probably.

VICE CHAIR HANNA: Could I ask one more and we'll let you go, commissioner?

COMMISSIONER ASSELTA: Sure.

VICE CHAIR HANNA: You mentioned a lot about new resources and new generating capacities.

Could you talk a little bit about the aging capacity that we have in the State; and, are we going to be able to work the magic that is going to have them replaced in time with either renewables or cleaner fossil units and how do you see that working?

COMMISSIONER ASSELTA: I don't see in the future a new generation plant being built in New Jersey simply because -- and I think DEP will play a large role in that and probably the commissioner could give you his opinion on that.

We're going to continue to rely on purchasing out of state. PJM has an obligation to create new generation to meet our demand. We are pressuring them from the FERC level on a daily basis with other partners, other states; that is a huge

problem.

We are right now doing some public hearings in northern New Jersey to cite new distribution lines to bring more power to the northern corridor of our state in through New York state. I'm going to be chairing most of those meetings up north and I suspect they're going to be pretty contentious.

The issue with New Jersey, I believe is, I mean, we generate 51 percent from our nuclear situation. We are not going to build any more coal or probably gas-fired generation units, although there are some private-sector initiatives that will generate their own energy.

I know yesterday, it was announced

down in South Jersey, I believe, a hospital and a college were going to combine on a CoGen down there. And I think that's probably the wave of the future, smaller operations that just dictate energy supply to their own needs; but generally speaking, I believe our goal would be to improve distribution availability so that when the demand grows, we have the infrastructure in place to accept that demand.

And that demand has to -- that generation will grow probably west of us, if we are successful.

MR. THOMAN: A question being with the, I guess, the import of electricity from neighboring states, along with that comes the exporting of jobs, as well.

COMMISSIONER ASSELTA: Uh-huh.

MR. THOMAN: How do you see that going in the future?

COMMISSIONER ASSELTA: Well, I don't like it. I've always been a job creator and an economic development person in my legislative days, but it's reality today. I mean, we're not -- I think the question was: How do you see the future?

Would I like to see a new generation plant in New Jersey?

Quite frankly, my own opinion, I

would like to see another nuclear reactor in New Jersey. I think it's clean energy. I think it doesn't obviously affect our carbon situation.

As far as building generation plants, I think we would have a hard time

siting them in New Jersey right now considering the population density. And I only can speak from experience because I come from probably the most rural area of New Jersey in Cumberland County, Salem County and what we had to do just to place a motor sports park in the City of Millville was short of criminal. It took us three years to get just approvals and get everything -- to deal with issues and litigation just to get an economic development project through down there.

So the environment, the political environment and the citizen environment makes it more difficult to build generation in New Jersey.

And I know -- I listened to what everybody does here and I understand you're concerned as a leader in your union and I think you have legitimate argument there because the last thing we want to see is a loss of any job in New Jersey. And I guess we have to get more creative and create some other opportunities like green jobs we've been talking about and the commissioner mentioned

that.

Thank you.

VICE CHAIR HANNA: Thanks very much, Commissioner Asselta. We appreciate your time today.

COMMISSIONER ASSELTA: Thank you.

(Commissioner Asselta was excused.)

VICE CHAIR HANNA: I see Assemblyman Chivukula is here today and I'm going to hand over the introduction to my colleague, Michael Egenton.

Welcome.

MR. EGENTON: Welcome, Assemblyman. We certainly appreciate your being here.

Just real briefly, Assemblyman Chivukula represents District 17 here in New Jersey. He is also the Chairman of the Assembly Telecommunications and Utilities Committee. And he brings a wide experience and background in this field and a number of pieces of legislation that the Assemblyman has been involved with through the Legislature and the Governor's office are constantly discussed before his committee, a lot of pieces of legislation related to this topic today so we really couldn't ask for a better representative from the legislative part of the three branches of government and we're looking forward to hearing your views.

Thank you, chairman.

ASSEMBLYMAN CHIVUKULA: Good morning and thank you. Thank you for accommodating me. I was behind a funeral procession. I thought I'd never get here. Yesterday, it was the empty wallets and then today...

Good morning and thank you for this opportunity.

Just as background, I'm an electrical engineer by profession. I have designed electric, fossil and nuclear power plant operator training in New Jersey. And because of my background, that explains that I have done a lot of work in that area.

I have been in the Legislature for eight years and I have been serving on the Assembly Telecommunication and Utilities Committee. And the last three years I've been the Chairman of the Telecommunication and Utilities Committee.

I have really focused on energy for the last couple of years and trying to see how we can really look at the various issues and various challenges and also opportunities throughout the State of New Jersey.

And as many of you know, the Energy Master Plan was released October 2008 and has forced some of the challenges, as well as the opportunities.

One of the key points the master plan was stressing on was trying to reduce the demand. Demand is growing very rapidly and you can reduce the demand using energy efficiency and conservation.

And if you look at it, that is really -- work with the energy demand supply goals and you could release, projected release about 640 megawatts of electric demand. It is the equivalent of two medium-sized power plants, but, of course, there is a lot of challenges.

There was an earlier question about some stimulus. There is some stimulus

55

money coming into New Jersey, about $123 million through the Department of Community Affairs trying to help people out with low income energy assistance, heat and energy assistance programs.

The State of New Jersey spent $185 million last year. And this $123 million is going towards projects to do the weatherization and to change our windows project of $6500. So this is one piece of the energy stimulus package.

Also, Commissioner Asselta talked about the 73 million towards -- some of the programs through the Board of Public Utilities.

There are also other monies towards the research that you can do in terms of coming up with energy alternatives. And, also, the -- going back to the Energy Master Plan, we have a 1500 megawatts requirement for the combined heat power plant. And I think they are quite efficient.

If you look at a conventional power plant, it is just about 31 percent or so efficient because it produces a lot of heat

that is used when you are using a power plant, a lot of the heat is escaping. And if you look at a combined heat plant, as well as a combined cooling and heating plant, they are much more efficient, up to 70 or 75 percent you can get up to that level.

Having a target of 1500 megawatts of combined heat power per plant and we have today, the Governor signed a bill on a Retail Margin Fund, Assembly Bill 2507, which releases up to $90 million towards creation of combined heat and power plants; that is one thing.

We have targets for the global warming response. There is a 21 percent reduction of the greenhouse gases by 2020 and a requirement of 80 percent reduction by 2050.

And so to meet that, we have had a cap and trade program for the carbon dioxide, which is the Global Warming Response Fund Act, which was signed into law last year in January and for which there are monies that are going to be available and 60 percent of the monies are going to be distributed through the economic government authority and 20 percent

to the Board of Public Utilities to residences and 10 percent to the municipalities and another 10 percent for the forestation and for carbon and greenhouse gas administration so there are opportunities there.

The first option being about $15 million. And if you look at it, hopefully there are about 24 million tons of carbon dioxide that has been produced at a rate of

$3.50 or $4.00, you know, you can calculate the numbers, more than $70 million that can be fetched.

It is also a market-based program. With the cost of the recession now, I think we may not get as much.

From an environmental point, it is a good thing that we are producing less carbon dioxide, but from an economic viewpoint, people are losing jobs and we need to create jobs so that people can be gainfully employed in the State of New Jersey.

And the legislation I have been working on is to look at, you know, as Commissioner Asselta said, It is difficult to build a nuclear plant. A nuclear plant is an

issue. If we were to decide to build one today, it would take about -- going through the permitting process at the federal and state level, it is going to take you at least 12 years so we need to think about how do we meet energy demands for the State of New Jersey.

One concept is -- it's not a new concept is distribution generation. Distribution generation through combined heat and plants and wind and solar, making use of those energy alternatives.

One of the things that is not really talked about is hydro, which is very important to me in the sense when people think about hydro, they think about Niagara Falls and these huge things, not necessarily new technology, whether it is the hydrocoils, or a lot of other technologies using waters and there you can put them under the riverbeds and the streams. You can really look at hydro. This is where we need to focus in on.

And hydro is even cheaper than nuclear. And when you take carbon cat (ph) and you put it on the coal generation or

natural gas generation, it really makes it quite expensive.

So we need to think about an infrastructure that facilitates or enables the distributed generation so we need to think about a micro base and the concept where if you are a hospital campus or a university campus, where you can have your own generation and you could always connect in to the grid for the energy that you generate that you don't need, you can connect into the grid. I think we need to think about that.

There are issues associated with utilities, how, when you have a distributed generation like that, especially when you are in a condominium complex where you can have the energy collaborating so that these people can distribute from the solar or wind, whatever that might be and distribute it to that complex and they are functioning like a utility, but are not quite a utility.

We need to think about how to deal with the issue of society benefit charges and are we treating them on par with utilities. So those things have to be worked out. So

distributor generation is a key thing and micro bases are going to play an important role.

Wind. Everybody is high on wind. And if you look at the wind, actually from the wind capacity, it's only -- you're going to get about 13 percent. Those are the numbers.

In order for the winds to really work, you need to have Glasgow (ph) winds. And if you look at the wind map of the world, there is not too many land masses where you're going to get a lot of wind. You have to really go off shore and that is one of the projects that the Board of Public Utilities has contracted which is 17.5 million to try and see it off shore off the Atlantic coast and we have to see that.

Solar is again probably 25, maybe,

at most, 30 percent. And it is -- so we need to have a sustainable generation, sustainable electricity that is what is needed. The variables are good.

We have a very aggressive venue report for your standard, that is part of my legislation, which is the Assembly Bill 3520.

We're trying to see how we can get this solar energy. And the rebate programs, you have up to 2012 through the Board of Public Utilities. Congress passed the legislation on providing investment tax credit for up to 30 percent and combining those things, still the solar energies could be quite expensive.

I think the key is that trying to look at distributor generation is an important thing.

Also, we need to look at other technologies like hydro. We need to put a lot of emphasis on that. And one area I talk about it, it is not a very popular thing, but I have to say that a lot of the times when we have our solid waste, we are putting it in the landfills and there was a study that showed that there is only 21 years capacity of landfill, capacity that is available.

When you take the solid waste and put it in a landfill, they produce methane gas, which is more than 21 times more potent than carbon dioxide. And when you ship the solid waste to Pennsylvania, what do we get back, we get back methane. And even though

there are power plants that operate using methane, they are not as efficient as making use of new technologies.

When I use the words plasma gas station, it is not a very popular thing. They have plants operating in Japan. But there are other technologies, you can burn the solid waste; when you separate out all the toxic material and you can burn that thing at 3000 degrees. There is an opportunity to really look at it.

I think we cannot close our minds to the possibilities and yet we want to replace all -- we want to be carbon neutral and how do we get there. If we have to build a new building, that new building should mark change so that we build a zero energy building, we want to make use of the geothermal, which is not a -- nobody talks a whole lot about geothermal.

Geothermal is an opportunity we need to look at. And, also, look at the building material, whether volcanic ash or other building material that can provide much more insulation so that energy losses are

minimized, then you need to look at a lot of the -- how do you use the heat and for our cooling that is recirculating that. These are opportunities we need to look at.

Of course, when you look at all these new technologies, it is going to cost money. And up-front costs are going to be so high in economic situation like this, it's very, very difficult. Everybody is looking for rebates. And we know what happened in Germany and all that, they have provided a lot of heat and rebates, but solar programs, they are quite expensive. Somebody has to pay for it. They didn't pay it and right now -- nobody knows how much they are paying for this alternative energy.

So we need to achieve a balance and we need to create jobs for the State of New Jersey. We would love to see them as green jobs.

We also need to make sure that the energy efficiency -- we need to make sure that with energy conservation, there is a tremendous, tremendous education and consumer behavior that has to be changed. People really don't understand.

The way we design electric outlets, people think about when we plug in chargers that it takes up a lot of load, but in connecting anything to an electric outlet, if you take out all the electric outlet, they are a major, major heat chain. And that is one of the studies that came out.

In India, as a Third World Country, they don't use any electric outlet without a switch. They turn off the switch so that is one. I think we need to think about that when you talk about constructing buildings. It's a challenging task to talk to the builder. The farmers are more rigid. I think builders come right next to them so we need to see how we can convince them that they have to be socially responsible, civically responsible so that we are conscious about environment and energy because we want to see how we can become energy independent.

We can pass all the acts we want. I mean, Congress passed an act in 2007, the Energy Independence and Security Act, and they introduced smart wind technologies. We need

65

to explore smart wind technologies with as

much of the stimulus package, there is
$4.5 billion towards grants for various
companies to apply for, smart wind
technologies, where we can introduce two-way
communication and intelligence so that we can
manage the -- not only the transmission
losses, but also manage the network, as well.
I think these are some of the
things we need to look at and I think I've
almost gone 15 minutes and I can talk about
this stuff for a long, long time. I'm going
to stop there and if you have any questions.
VICE CHAIR HANNA: Thank you. We
are running late, but do we have one question
for Chairman Chivukula.
Go ahead, Jim.
DR. BLANDO: Actually, I have two
parts to my one question.
You know, we had a meeting at the
Union County Utilities Authority, Joe's old
place. And I find it interesting that
although at times, it can seem unpalatable,
the idea of waste to energy, the impression we
were left with is that only 15 percent of the

66

State's waste goes to these waste energy
plants; and that that technology not only
reduces the cost of disposal, but also
generates electricity and that these plants

have sophisticated air pollution control equipment in place.

I am curious if there is a move afoot to increase the flow to those waste energy plants to the State as part of the Energy Master Plan.

ASSEMBLYMAN CHIVUKULA: I think -- not that I know of. I think one could definitely look into that. I think sometimes people look at, there are companies that look at waste as gold. I don't know what they do with it.

We want to reduce the waste. We want to have good recycling programs. For example, everybody talks about CFC, fluorescent bulbs. And we don't have a single recycling facility in New Jersey. The nearest is in Pennsylvania.

We need to think about adding recycling facilities; that's one thing. I think that's a good idea. I think some

legislator should definitely look at that. Energy from waste is a critical thing and there is an opportunity for us to make use of it.

DR. BLANDO: And I guess the second part of my question is with regard to nuclear power.

The Council in the past has come out very much in support of nuclear power; however, it seems as though the one sort of lynchpin to the nuclear power question is the waste issue and the lack of a comprehensive federal strategy to deal with the waste.

I am wondering if there is anything that the State Legislature can do to help facilitate or motivate activity on the federal level to come up with a comprehensive national policy to deal with the waste from nuclear power plants.

ASSEMBLYMAN CHIVUKULA: Certainly, not in an election year, nobody is going to touch nuclear.

I did receive some letters from one of the legislators from another state asking me to write letters to the federal

68

legislators regarding Yucca Mountain. Of course, you have Senator Reeves, he is from that area and as long as he is there, nothing is going to happen.

VICE CHAIR HANNA: Thank you very of.

(Assemblyman Upendra J. Chivukula was excused.)

VICE CHAIR HANNA: Checking our agenda here, I think we are up to Mike Aucott.

Mike is here, right?

MR. AUCOTT: Yes.

VICE CHAIR HANNA: Mike is a guy I've known a number of years and always been impressed with his work. He is a scientist with New Jersey DEP's Office of Science and his work includes estimation and tracking of New Jersey EE emissions, greenhouse gases. He's really the father of New Jersey's greenhouse gas inventory, I think; maybe father and mother, I don't know.

He will be speaking this morning on kind of the outlook into the future, the inventory today and what we think the business as usual case will look like both on the

69

greenhouse gas emissions inventory side and, Mike, you're also going to cover something about the demand curve in New Jersey.

MR AUCOTT: Yeah, I'm going to try to.

VICE CHAIR HANNA: What we think we're going to try to have to create for generation in the future.

MR AUCOTT: Yes.

Thank you, Toby.

We're going to talk about the inventory and electric demand predictions, relying heavily on the master plan for the latter.

Let's see. I can probably figure out how to work this, but maybe not. Maybe just -- I'll give you the signal for the next slide.

Emission estimates are developed by DEP based mostly on data from the US Department of Energy, Energy Information Administration. We also use some other data, landfill data and some data that we get from EPA on some of the halogenated gases.

As Toby mentioned, this has been

70

going on for awhile, but we are continuing to refine the methods and we expect that in the future, we'll have a more timely inventory and also a better inventory as New Jersey specific data becomes available.

The Global Warming Response Act does require reporting. And there is a rule proposed now that is in the process of being adopted and that will bring data into the State that is New Jersey specific and that will help us.

What we do when we try to turn energy-use data into greenhouse gas emissions, it's pretty much a function of how much carbon the fuel contains. There are some adjustments that are made.

This -- do we have a pointer up here, a laser pointer that works?

If not, it's okay. I can point out some things; but you see that, for instance, nuclear energy, which is the light blue chunk up there doesn't translate the carbon emissions.

Some of the other fuels do, but not proportional, one of them is jet fuel.

71

There are some assumptions with that, that a lot of the jet fuel is not actually burned in state or under the control of New Jersey.

There are some assumptions that are made and these are some of the things that may be revised, as we go forward; but essentially we translate the energy data to greenhouse gases and then add some others for things that don't come directly from energy combustion or fuels combustion.

Emissions projections.

In-the-future predictions were developed essentially with linear methods looking at historical data. And there was a series of work that's been done and we relied heavily on some of the work done by BPU, also, on energy information administration data to project the trends into the future, but there is a huge amount of uncertainty with that.

This is really a cartoon. It shouldn't be taken to represent -- particularly, this trajectory here, has not been nearly as linear as it looks. But the datapoints on this, the 1990 datapoint, the 2004 datapoint, which is the end of the solid

line and then the projected BAU, those three data points do seem to line up in a straight line.

And this was done, just in an attempt to give an order of magnitude picture of the degree of reduction that's needed to reach the 2020 limit. And you can see that it is -- you know, it appears to be fairly substantial; but keep in mind that the scale here starts at 110. And it's expected that the -- several of the programs that have been, I think, mentioned already, the Energy Master Plan, the low-emission vehicle program, RGGI, together, if all three are successful, should result in the State meeting the 2020 limit.

We now have some very preliminary 2005 and 2006 estimates of the greenhouse gas emissions. They reflect some improvement in the methodology, not a whole lot of change. They are very preliminary. These are really draft drafts at this point; but interestingly, they show a very large reduction from 2005 and

2006.

If we look in a little bit more detail at some of the breakdown, you can see

that the bottom line, the emission reductions are lower by about 8 million metric tons in 2006 from 2005.

And, again, these are preliminary and subject to change as Tom Graedel, I don't know if anybody has run across Tom Graedel, but he is at Yale now. He is a very prominent, I guess, atmospheric materials accounting scientist. He has said that emission inventories are never accurate and they're never finished; and that, certainly we've experienced that ourselves.

So these numbers may change, but this is what it looks like now. And to put that in perspective on our cartoon, you can see that 2006 and 2005 look very different.

This is encouraging, but before we start to jump up and down about this, we need to take a look at why this may have happened. I think we can argue that some of it is probably due to progress and energy efficiency; but, in my view, at least from the preliminary look at the data, weather fluctuation is probably a major factor.

Why do I say that?

Well, let's take a closer look.

If you look at the commercial and residential, the first and third line up there, the two together account for about 4 million metric tons change in the two years, those two sectors. And this is -- the emissions from these sectors are essentially the fuels that they burn. The electric energy is a separate sector.

Most of what residences burn in the way of fuels is for heating and similarly with commercial. And if we try to take a picture of what influences how much fuel we use in one year or another, it's important to look at weather in a little bit more depth than we typically do.

One way we do that is with heating degree days or cooling degree days. A heating degree day is the difference between 65 degrees Fahrenheit and the average temperature for that day. So if it's 30 degrees, if that's the average temperature, that's a 35 heating degree day. 35 heating degree days was chalked up with that particular day. If the temperature average for a day is

80 degrees Fahrenheit, that's 15 cooling degree days. So you can tally up those for a year and you can look at them.

Interestingly, this is the last 15 or so, 18 years. These are estimated based on data from the New Jersey State Climatologist and these are estimated by me so there could be some errors here, too. It's interesting how much fluctuation there is from year to year, on the order of 20, 25 percent a year in heating degree days.

If you look at this plot, you can see that 2005 and 2006 were quite different. 2006 had very few heating degree days compared to 2005. It was essentially the heating ones of calendar year 2006 were warm, relatively warm. And if you compare that plot with the residential and commercial combined greenhouse gas emissions, I would maintain that they correlate quite well. You can see where there is a peak, there is a peak in the residential/commercial. Where there is a dip, there is a dip. It's not, you know, strict on one to one, but it looks to my eyes as if it correlates very closely.

76

Sure enough, 2006 dips, as does the heating degree days. So I would argue that that's a portion, at least, of what we're seeing. And it's important if we're going to track our progress in meeting our goals that we -- it's probably important to normalize for weather to some degree, to consider doing that.

The dotted line is a preliminary, somewhat crude attempt on my part to normalize for weather by assuming a constant 5000 degree -- I think it was 5000 heating degree days per year. And if you do that, I think you may see, it probably takes a little courage to make a -- draw a line here, but there may be a decline somewhat in the commercial and residential sector, which would be what you would see from increased energy efficiency. So maybe we see some of it, but probably a lot of it is due to simply weather fluctuation.

Also, if you look at both the in state and imported electric totals, the total of the two together, 2006 is much lower than 2005.

77

One of the things we use electricity for is -- and this is just a plot of the imported, which is the upper area and the lighter gray is the generated in state. The total is the top line there.

Interestingly, when we produce

less in state, we import more; but overall, there is kind of a trend, but you can see a couple of peaks there and one of the things we use electricity for is cooling.

If you look at cooling degree days, there are also peaks in calendar year 1999 and 2006 -- or excuse me, 2005, which correspond, if I could go back a slide, a couple of those peaks correspond to the peaks in the electric use so I would argue that there is also an influence of hot summers on electric use.

Let's go a couple slides.

What about the future; what does this say?

Well, I think it just shows that there are outside influences that come into play with our predictions and that it adds reason to realize that there is some

uncertainty in all of the efforts to predict. Nevertheless, we do have to do that to try to get a sense of where we're going.

When we do that and the Energy Master Plan does have predicted electricity use, and this is from the Energy Master Plan, you can get this online and there is the web address, it shows that overall, electricity use is increasing at about 1.3 percent per

year.
And, interestingly, our two previous speakers, I think, both mentioned that the peak use is also projected to increase at an even faster rate.
This is important because we have to plan for peak use. The Energy Master Plan identifies four big challenges. And these are essentially what they point out as being the chief issues that we face: Growth and supply has not kept pace with growth and demand; the price of energy has increased substantially. It's become more and more volatile.
Without action, the contribution to global warming will continue and the State has much less authority than it used to, to

79

actually plan. The Energy Master Plan is a bold concept, but it may be -- the idea that we can plan our future is not -- we don't have as much authority as we did before deregulation.
The Energy Master Plan identifies five major actions to meet the challenges, maximize energy conservation, reduce peak demand, strive to exceed the current RPS, develop 21st Century infrastructure and invest in innovative clean technologies and businesses.

And if successful, these actions will lead to major reductions in demand and increases in supply; but as we've already pointed out, because of outside influences and maybe things that we haven't taken into consideration, prediction is very difficult and that's especially true if it is about the future.

It is no surprise, we've all seen what has been going on with the stock market. Major systems have not been behaving linearly lately. Just as an example, if you want to see maybe the mother of all nonlinearities, it

80

is the oil market recently. I think it takes a huge amount of courage to draw any kind of trend from this. The price is back up to about $50 a barrel now, but, wow; and so, you know, so we have difficulties in predicting.

Also, we have a long way to go. The 2020 limit is a whistle stop along the way to 2050. We've got to make the 2020 limit. We have a prayer of getting to 2050; but 2050 is, is -- this is the relative size of the emissions that are -- that equal the 2050 limit, which is 80 percent below the 2006 number.

And this is the degree of reduction that's needed globally if we're going to avert a potentially catastrophic climate change. So while we think that we can make 2020, we have to consider where we're really trying to get to.

I think it leads to just some -- these, I guess, would be my recommendations based on these data. It's important to take the long-term view, expect there will be variations from our predictions and strive to take a broad-based, multi-faceted approach and

focus on the needs for resiliency, redundancy and flexibility and that's where I'll stop.

VICE CHAIR HANNA: Thank you very much, Mike.

Questions from the Council?

John, go ahead.

MR. ELSTON: Mike, it is was very interesting. I agree with your observations on inventory work, in general.

I was just curious as to the 2020 goal or standard that has been part of the governor's energy bill. I was curious as to what that standard really is, is it a robust three-year moving average or a strong -- or is it something you can make up or pledge or -- and the reason I say this because the second part of my question is: Do you think, honestly, with the DEP or without DEP, that

we're actually going to make that standard?
MR. AUCOTT: Well, the 2020 limit is established in law as being equal to the 1990 emissions. Given that there is some uncertainly in all these estimates, I suppose one could argue, Well, what is the 1990 number; but we do have pretty good confidence

82

on that number. We've looked at it a lot and I would argue you could -- you know, maybe within a few percent, we can nail 1990 pretty well. When it comes to 2020, I am sure there will be questions as to -- maybe -- my hope is we'll make it so easily that it won't be an issue. And I think that is doable, but it remains to be seen, of course.
MR. ELSTON: You think it's doable?
MR. AUCOTT: I do. If you look at the reductions we expect through RGGI, through the Energy Master Plan and through the California low emission vehicle, all three of those together look like they'll do it and then some.
Now, there is things that might not work as predicted with those. And this is the energy -- our actively working climate and energy group is going to come out with recommendations very soon, which will talk

about a lot of other approaches to reduce emissions, greenhouse gas emissions; so that's where some of this redundancy comes in. If California lab (ph) maybe doesn't work quite

as well as we think, then maybe something else will, but it looks like it's doable to reach 2020 from what I've seen.

MR. SPATOLA: My question is to what extent does population growth affect or lead into this whole idea of meeting these benchmarks or goals.

MR. AUCOTT: Population growth is factored into the estimated 2020 business-as-usual number. You'll hear from Frank Felder in a little while with the Center For Economic Environmental Energy Policy.

Did I get that right, Frank?

I know he was here earlier. He has done a lot of projections for BPU. And there is a lot of heavy-duty modeling that goes into that and I know population is part of it for sure.

VICE CHAIR HANNA: Thank you very much, Mike; that was exactly what we needed. We appreciate it.

(Mike Aucott was excused.)

VICE CHAIR HANNA: Tonalee Carlson Key is up next, are you -- there she is.

Thank you, Tonalee. Tonalee is also an NJDEP

employee with the air quality management program and her role is monitoring and assessing emerging air issues, providing policy and planning guidance on air quality issues and participating in regional air quality planning efforts.

Tonalee is going to be -- we've been talking a lot about climate change. This is going to shift over more to the subject of ozone and ozone attainment. Peak demand issues we talked about that a little bit earlier and this is the air quality, the really hard issues of air quality on peak demand areas.

Thank you, Tonalee.

MS. CARLSON KEY: Thank you. Thank you for the opportunity to speak on this subject today.

While we're looking for the presentation, this is -- I'm going to talk about a project that we have worked on since 2006 and have just finally culminated here in New Jersey.

In 2006, we had a number of states that got together and who became aware of looking at energy demand on particular days -- these are high energy demand days -- and what was happening with pollutants and air quality associated from that.

So I am going to give you an overview of what we've learned during this process and then how we carried this process forward in a regional effort and the outcome from that regional effort and how that carried into New Jersey and the action that we've taken to address emissions from generating units on high electric demand dates.

I just wanted to fit in a couple of other pieces about the high electric demand day generation project and the parties that played a part in that. And the things that we were very lucky in timing happened to make that a successful project.

So on high electric demand days, NOx emissions from EGUs go up dramatically.

And this, this is a graph of NOx emissions in tons per day and this is the megawatts, the electrical generation that is taking place in this multiple state area here. And as you can see, as the electrical

generation goes up, the NOx goes up

dramatically.

The second piece of information in this graph are the blue dots represent days on which there were no ozone exceedences in this area and the red dots represent days on which there were ozone exceedences.

The other thing I would like to call your attention to is the average ozone for the average ozone and nonozone days. Our average Nox production on nonozone days was 212 tons, but on ozone days we received over 370 tons for this. So there is a very substantial increase, 70 to 80 percent here. So not only are high demand electric days high Nox days, but they also correspond with high ozone days.

So we wanted to investigate this a little bit further and we started taking a look at, well, what was happening with the mix of generation units that was operating on various days.

This is what we found. This is a more recent graph than we were using during the project. We pulled up a 2005 to 2007

87

ozone season day electrical generating units. This is the percentage of time that they operated during the ozone season and these are the various units in New Jersey.

As you can see, not every unit, obviously, was running everyday so we had different units that ran different days.

In case you're not aware, the units that are at the upper end, running more constantly are usually referred to as baseload units. And the units that don't run as often are often referred to as peakers or peaking units if you're talking about combustion turbines and they're called load following boilers if they are like coal units or oil boilers.

So we wanted to look at the information a little bit differently. We knew that different units were running on different days and we wanted to take a look at, well, what was happening with the fuel types that were getting used on those days, what part was it playing in the Nox production.

This is data from the project that we worked on. This is from 2005 from the

period June 1, 2005 to September 15th, 2005 and this is looking at the units in New Jersey and New York City.

And here we have the Nox emissions in tons and then this is the various days arranged by increasing fuel or increasing Nox usage. And as you can see on this, we have a baseload unit of coal going on here and then we have -- that is on pretty much a lot of the time is the residual oil that is going on here (witness indicated).

As we get into higher Nox emissions, which correspond with high electric demand days, what we were seeing come in was the natural gas and diesel fueled units. These are related to conduction turbines. So what we were seeing was -- what this was telling us is that a lot of our Nox was really getting generated by these units that we were turning on, but what we found as we went into our regional process is that this is not clearly the picture in every state or in every region.

For example, this is the same period, but this is looking at the units in

89

New England, the same graph type, Nox emissions by fuel type. And as you can see, they have a very concentrated baseload coal that is running here and then they pick up a little bit of the natural gas in here.

So really what they have happen on their high electric demand days is that they have the load following boilers come on that are burning residual oil.

So we definitely learned that the

sources of the emissions in different regions was going to be from different EGUs.

So what we started taking a look at, what was happening on typical summer days and what was happening on high electric demand days and what that was beginning to tell us.

So I'm going to build this graph for you, this is looking at NOx emissions and types of days for two different types of day, typical summer days and high demand days and for two different time periods, 2002 and 2005.

So we see in 2002 for a typical summer day that we have 992 tons of Nox emission. This is for a six-state area. And on a high electric demand day, we're seeing

1615 tons of NOx, which give us a delta of about 600 tons.

Now, in 2005, we have 551 tons coming on that typical summer day. And what this was telling us is that, yes, the meteorology could have been slightly different, but we tried to match up the days as much as possible and stuff like that, but what this was telling us is that the baseload units were getting cleaner.

One of the big things that happened between 2002 and 2005 was one of the reduction steps from the Nox trip call (ph), the Nox reduction program for EGUs so we were definitely seeing this in this data here.

And in 2005, on a high electric demand day, we had emissions of 1300 tons. So what we were seeing was that while the baseloads were getting cleaner, the delta was getting larger, which meant that the units that were getting used on these high electric demand days were having a much more profound effect about what was going on, what we were seeing.

So with this in hand, we said,

Okay, so we have more Nox emissions, but what might this mean in air quality, which is the key thing that we're after here.

So we tried to do some committee modeling, which is actually not easy to do in this subject area. And we were looking at these units here. These were all designated as high electric demand day units. And we did some specific modeling with the models that we used for ZIF (ph), for the sensitivity mode not as a ZIF (ph) quality mode and we adjusted all of the emissions from those units that were marked down to .1 pounds per million EGUs.

Another piece that is in the back of here that I won't tell you about is the modeling. The models have not in the past reflected the actual operational SIMPORA (ph) profiles for these units. They actually have default profiles, which evenly sets the emissions during the day.

So another thing that we were actually trying to do was to build SIMPORA (ph) profiles which actually reflected how these units were running at the times that

they were running.

This is a result of that sensitivity modeling that we did. As you can see, we have broad regions where we're seeing 1 to 2 ppb reductions. And at this stage of the game in reducing ozone, that is actually a very important reduction, but we were also seeing very localized, very large 6 ppb and larger.

For most of you who are probably not intimately familiar with ozone data throughout the region, I can tell you that in areas like here in Connecticut along this coastal area, where we were seeing 6 ppb reductions in the sensitivity modeling, it's one of our areas that does have very high exceedences so it can have a very dramatic effect.

So we decided that we needed to

move forward to figure out how to do something with this information that we had. And we went into a regional effort, which we did with the states from Maryland up to Connecticut actively and we had other states who were sitting in on the process, but it was very

robust. It lasted for over a year. We not only had states, we had regional transmission organizations like PJM, that you've heard about. We had the public utility commissions, like BPU. And we had the generating companies and EPA who all came in to work on this project.

We spent a very concentrated year travelling up and down the east coast having meetings every month to six weeks to try and figure this out.

The result of this was an MOU by some of the OTC states to get reductions in the 2009 time frame. And I'll talk about that a little bit more specifically within the structure of what New Jersey did; and that was, to prepare a rule which we refer to as the High Electric Demand Day Rule, which was not a stand-alone rule, it was part of a very large package, wish list, just signed by the Commissioner a week ago and includes many parts besides high electric demand data.

In New Jersey, what New Jersey decided to do was to take a two-phase approach.

In the first phase, we were going after short-term reductions. And this was in line with what we had agreed to in the OTC MOU, which was 19.8 tons per high electric demand dates.

Now, we're not talking about over a season or over a year. We're talking over a certain number of days a year so this is actually a very large number because, as you saw, that Nox production was on the worst of days for ozone.

In this, we were looking to -- the short-term reductions that we're seeking are from May of this year through September 2014 and it is to help us in attainment of the '97 ozone standard. It applies to unit -- combustion turbines that are not controlled by water injection, boilers not controlled by SCR or SNCR and units that have Nox emissions with a greater than 1.5 pounds per million BTU.

One of the things that we heard from the generators during our process, which were very actively involved, was that in meeting these reductions in such a short time frame, they wanted as much flexibility as possible.

So this is something very new for us in regulations is that we do give them a great deal of flexibility in how to meet this reduction from 2009 to 2014. They put a plan together, they bring the plan in to the Department for approval. They can control peak units, the high electric demand day units. They can do reductions in usage. They can decide that they're very high emitting and they're not going to use those units on those particular days. They can control non-peak units and they can do this within New Jersey and within states that are upwind of New Jersey because, obviously, those reductions would benefit in ozone reductions to New Jersey.

We looked at a number of things, as well as their ability to do energy efficiency, demand response or renewable energy that could be counted towards their reductions here.

In the long term, we're looking at performance standards for these units. And these are the turbine units. These are the

96

boiler units here.

This is a very big effort for some of the utilities because they'll have many units that are affected by this. It will result in shutdown of some of the units and the replacement of others that cannot be retrofitted in order to meet these standards; but our estimated reductions in the 2015 period when this is fully implemented is 64 tons per day on high electric demand days so we're not just hitting -- making ozone -- having less ozone from the Nox, but also on days when it is likely that it counts the most.

The rule status, as I said, the commissioner has signed this rule. It will be in the Register on April 20th and will be effective May 19. And the final rule will be available on our website once that has occurred.

The regional record on this, all of the stuff that happened is actually on the OTC website if you're interested in looking at this material.

Now, the other thing I wanted to

97

talk about was the interesting pieces that pulled together on this because this is quite a steep learning curve for us here in the planning program who did not have a background in energy and needed to in order to put together a successful program.

The Regional Transmission Organization, you've heard of RTO, which New Jersey is a part of. These are the people who control the wholesale movement, pricing of electricity. We interacted with three different of these organizations within our regional process. ISO-New England was actually very highly involved with us. They cover from Connecticut north. New York-ISO covers New York State. PJM covers New Jersey heading west as far as Chicago and south all the way through Virginia, has parts of Kentucky and they're not necessarily contiguous areas within some of those states.

They taught us a lot about alerts. We needed to figure out what are high electric demand days. They taught us about alerts. They taught us about electric distribution. They taught us a lot about demand response.

98

I know that Commissioner Asselta, if I said that correctly, was talking about demand response. He was talking about one part of the demand response, which is curtailment; that means industries that would choose not to run their particular operations during a high electric demand day or something like that.

The other part of it are industries, are users that come off the grid. They no longer take electricity from the grid, but they do not reduce their operations for the day, instead they use an alternate store, which is many times a generator; that's problematic for air quality on high electric demand dates because generators are traditionally very dirty.

Fortunately, in New Jersey, this is an issue that we've already addressed and these generators that might be used for this purpose have to meet performance standards, but the same is not true in some of our neighboring states which still have to tackle this particular issue.

The other thing that we learned

99

about was capacity payments. This is something that was going on when we started this project and it turned out to be something that was very important for the generators to be able to do this new reduced demand for these high electric demand dates.

And very simplified, in this new structure that PJM has put together, you can come in as a generator and bid in and, say, in

2012, I will have this much capacity ready and PJM will rely upon that in their planning that you are going to have that unit up and operating at that time and you get payment during this time based on that commitment that you've made.

Now, the downside is if you don't meet that commitment, the ramifications are quite severe. So that is not something that they want to do; but it was definitely, the size of the capacity payments and how they were made was very important in the generators being able to participate in this and we were very lucky that they were in the process of doing this.

The other participants that we had

were the public utility commissions, like the BPU. And they taught us a lot about energy planning and energy structure and things. These are not things that we traditionally get into from that subject side in planning. The BPU did participate with us.

And we were very lucky, also, that the Energy Master Plan was in the planning phase and so it gave us some leeway at times on what we could do, in how we were trying to address high electric demand dates.

If these pieces for capacity

payment and an Energy Master Plan hadn't been in the development phase, it would have made our jobs much harder because we would have been confined to certain parameters that we could work on.

I do want to acknowledge the generators because these are the parties who have to operate under all of these organizations. And, as such, they are the ones who really knew how the energy side, how the selling to the PJM market side and how the environmental side were affecting them.

When we were trying to problem

solve to get together a good rule and even within the regional process, they were really our reality group: What if we do this? Well, if you do that, we can't do this because the energy side tells us this or PJM requires that. And they were really the reality glue because they are the ones who have to exist under all of these rules. They were a very valuable partner and were a very good partner in this process.

The one thing you probably haven't appreciated thus far is that doing a project on high electric demand days was very delicate because we are talking about the lights going off. If you don't have the energy and if you don't have the energy on those particular days, the lights are gone. The electricity is not on.

So although I haven't gone into it, our working around a very delicate situation to bring this together was trying at times, but we were successful in doing so.

I would like to acknowledge the members of the team that participated on this. I think a lot of you know Chris Salmi, the

102

clean air director. Tom McNevin, who is in the back. Mike Hogan, who was our rule manager on this and who today is your computer operator. Yogesh Doshi, I think is here. Danny Wong, from our emission statements program. And Shan He, a name that you may not be familiar with, but we have an air quality modular in the plan group now, Shan. He did not do this previous work, but we are actually continuing this work on high electric demand monitoring.

Any questions?

VICE CHAIR HANNA: Thank you very much, Tonalee.

We are about 15 minutes behind schedule.

Can we have one question for Tonalee from the Council?

MR. ELSTON: What constitutes a high demand day, by definition, No. 1; and No. 2, in the short-term plan that the commissioner just signed, how is the kind of broadly based approach evaluated as far as compliance?

MS. CARLSON KEY: There is a

reporting requirement. Actually coming up with a definition for high electric demand day was part of our regional process. And within our rule for New Jersey, it is a 52,000 megawatt day or greater within the PJM subarea, which includes New Jersey. So if the electricity demand is forecast to be above that, then that is determined to be a high electric demand day. There is a day ahead forecast on what the electric demand is going to be.

MR. ELSTON: Do you have any thoughts on how many days on average that might be?

MS. CARLSON KEY: Actually, we did a whole analysis on that and because it is, obviously, going to be weather tied, it changes, but we're talking somewhere probably 10 -- probably a range of 8 to 15. And we also set that number so that we could have as few false positives, as possible; that means

days on which it was greater than 52,000 megawatts in which we did not have ozone exceedences.
VICE CHAIR HANNA: Thank you very

much, Tonalee.
(Tonalee Carlson Key was excused.)
VICE CHAIR HANNA: Dr. Frank Felder is next on our agenda and Dr. Felder will be talking about some of the economic and market realities and background. Dr. Felder is the Director of the Center for Energy, Economic and Environmental Policy at the Edward J. Bloustein School of Planning and Public Policy at Rutgers.
He is also a member of Rutgers faculty and of note and of importance to us today is his center performed the modeling effort in the New Jersey Energy Master Plan, which you've heard quite a bit about already today, so it is information that is relevant and pertinent to us and we appreciate his being here.
Thank you.
DR. FELDER: Well, good morning. Thank you very much for having me here. I think I was here a year or two ago and I really enjoyed the experience and I am looking forward to it.

I know we're a little bit behind.

In my experience, the one time I was here before, probably the best value I think I can add, if any, is to answer questions.

To be candid, you are going to hear a lot of answers today, a lot of proposals, you should do this, you should do that, don't do this.

And to be candid, answers are a dime a dozen. I am in the business of asking questions, questions are a lot harder, to come up with the right questions.

So what I would like to do is just briefly set up some questions if I were in your position which, obviously, I'm not, but if I were, what would be the types of questions that would be roaming through my mind and then I'll ask you to ask answers and then I'll give you the questions to those answers. I think we'll have plenty of time for discussion. I really think that's where I got the most out of this the last time I was here.

I hope this doesn't give you vertigo. I want to speak briefly about the context, although the previous speaker talked a little bit about PJM and electric wholesale, but there is more to that.

I also want to talk about the notion of economic efficiency. You've heard a lot about the term efficiency, energy efficiency, how an engineer thinks about efficiency and I'm an engineer by training, but I want to talk about economic efficiency and its importance. We just can't get around that in our crafting of policies in this area.

I want to talk about some key questions, as I mentioned; and then, also, talk about alternatives. You've heard and you will hear, I suspect, specific technological alternatives, solar, wind, bio-mass and we can go down the list, but I want to talk about another way of thinking about alternatives that I think would be useful and then if there is time, Q and A.

Context.

Well, energy and environmental problems, unfortunately, span large barriers or large boundaries or international, if you think about the oil market, the coal market, even liquefied natural gas. There is

certainly national/continental, if you think about natural gas. And in terms of electricity, they are regional, the PJM region, which was described as the 14 states where we transmit power over roughly a thousand plus miles.

Air emission, well, CO2 is an international problem, global warming, hence the name; whereas NOx and SOx, other air emissions can be local, mercury can be international and so forth.

So you have this disconnect between the boundaries that are the differences and the boundaries between fuel and between the air emissions.

Unfortunately, notice the word I don't have up there is state. The state boundaries were designed back in the late 1700s before all this came to be. And the extent of understanding this problem was artificial, which makes your problem even more difficult because you're trying, as you know, from the state perspective, to influence regional, which is tough even with electricity, let alone national and

108

international.

A good question someone asked is: How do we influence national policy with nuclear waste?

Well, that's this problem in a nutshell or one example of it.

The wholesale electricity market is a relatively new phenomenon. I mean, it's 10 or 15 years, but it, as Mike Aucott mentioned, and the Energy Master Plan acknowledges, reduces even further the State's ability to control its future with respect to the electric grid, which is about a third or so of our emissions of other types. So it is a large source of our energy in terms of total energy consumption.

I would point out that we use very little oil in electric generation, although it has a large impact when you do use diesel oil on high electricity demand days, which I think is a great example and we'll talk about some of the implications of that in a different context.

In terms of energy independence, renewables on the electric grid don't get you

there; that's where you have to hit the transportation policy. The reason I bring up that objective is we're going to talk about different policy objectives and their difficulties in a moment.

Okay.

The other complication is we have

a mixture of planning and regulation, even PJM, this interstate ISO, independent system operator that operates the wholesale markets -- administers -- operates the grid, administers the wholesale markets has a planning piece for transportation, for transmission across the states. And, of course, within the State, it's distribution from the transmission system to the end user.

Think about on the environment side, we have a mixture of cap and trade type markets with the SO2, NOx and CO2. We have planning standards, you know, certain standards regarding air emissions and so forth and bringing those two pieces together, one way to get where we want through market mechanisms and another way through planning in itself raises difficulties.

110

And as I mentioned, we have these various allowance markets with overall, obviously, the CO2, the RGGI is relatively new, but SOx and NOx with their touch into high electricity demand days have been relatively successful and that, I think, may be a path to go forward.

If I knew that, I would just click it.

Anyway, the importance of economic

efficiency, why is that key and what do I mean about it?

Well, it means doing more with less; okay? So it's achieving the same result with using less or achieving a better result with using just what you were using before.

There is no way out of our long-term problems without improving efficiency. There is just no way out. What efficiency does is it grows society's resources, that tempers the conflict between various interest groups and allows us to have hope that our children will live better lives than we do.

So at the end of the day, in my

opinion, there is no getting around it, your policies or proposals really must consider, how do we increase economic efficiency, how do we continue to put ourselves on a path that we can do more with less because in order to even have a hope of getting to the 2050 goals or any variation of it or in any other part of society, whether it is education or security or you name it, we need to have more resources in order to get there.

And when I use more resources, that doesn't mean we get to off-lay waste on the environment. So, you know, it's not efficient to damage the air shed in order to have more widgets, that's not efficient. Okay. So we need to think about how do we do more with less in terms of all of our resources.

If we don't figure out, if we don't put in policies over the next years to do that, what will happen is there will be huge fights within the interest groups because one group -- when you're fighting over a shrinking or static pie, the fights get more and more dramatic.

So in my view, you really need to think about how we can make sure our policies, whatever they are, make that better off five, ten, fifteen years down the road in an efficiency way.

Now, there is more to energy efficiency, more to efficiency than just the engineering definition, right? So when engineers talk about efficiency, they talk about how much work do I put in and how much work do I get out; that type of input/output analysis.

Well, you also have to consider costs so it's not just how much fuel do I put in and how much electricity do I get out, it is how much does it cost, how much labor and materials and so forth do I need in order to do that so we need to think about it in terms of a broad concept, not just in terms of fuel or emissions but in terms of total cost.

I put this up at some risk. We can make jobs all day long. You could dig holes, you could fill them up and I, being an academic, could comment on them; that would create three jobs and we could repeat this

113

overall.

What we need to do is create jobs that add value to the economy, that make us more efficient; that is the only way those jobs will be long standing and sustainable. We can for short periods of time create jobs and maintain those jobs, but eventually we'll have to pay the piper, eventually those jobs have to be efficient. They have to contribute to our overall economic well being otherwise they won't be sustainable so I think we can all think of examples of that.

I certainly understand the pressures that many or all of us face of this type and I certainly understand politically, jobs, jobs, jobs; that being said, we need to think carefully. We need to also make sure that we are creating those jobs in a way that there will be a job there five years from now, ten years from now and just not for the near future.

The other difficulty is that this involves trade-offs. There is no way around it. You're feeling this every minute today and I'm sure in your deliberations. If we do

more here, what does it cost. If we do reduce this emission, what is the implication on the economy. If we don't build plants within New Jersey, what is the implication on jobs and so forth.

There is no way to get around that notion of trade-offs. The key is how do we optimally trade-off on those various factors.

Now, if we can grow, if we can have innovation and economic growth, those trade-offs get easier and easier. They're still there, but they're easier over time.

Incentives matter. I'll skip to a quick story. Incentives matter. How people respond financially matters, not just their initial response, but how they respond over time.

What are some key questions if I were in your shoes, if I was in your seat.

Exactly what is the objective or objectives a certain proposal is trying to achieve?

Specifically, what is that proposal or alternative that is being floated trying to achieve and how much does it achieve

that objective; specifically, what is it trying to do, is it trying to solve high electricity demand day issues, Nox and ozone issues on hot days; that's one thing.

Is it trying to reduce energy or improve energy dependence; is it trying to reduce CO2?

Exactly what is the objective trying to resolve. What we don't want is a hammer looking for, you know.

Given those objectives, given the proposed objectives that someone's proposal is trying to achieve, is there a cheaper way to do it, a less expensive way to do it; that is something I think anyone who makes a proposal needs to answer. Typically, they don't. Typically, what people do, and I can understand this, is they say, Well, we could build a nuclear power plant in every home or we could put a solar panel, you know, on every square acre of New Jersey. Yeah, we could do a lot of things.

The question is: Given the objectives we're trying to achieve or that that proposal is trying to achieve, is there a

116

more efficient way of doing that?

Does the proposal acknowledge its limitations?

There is one question I would like to ask anyone who makes a proposal, including me, is: Under what conditions should we not do what you're suggesting; under what conditions, should we not put solar panels on warehouses; that doesn't mean I'm against solar panels. It just means I'm trying to understand what are the limits of that.

Under what conditions don't we build a nuclear power plant; under what conditions do we? Because it really forces the analytical discipline and rigor to say, Let's understand the conditions where this makes sense and where it doesn't.

Nuclear power doesn't make sense everywhere. I'm a former nuclear engineer. Solar panels don't make sense under all conditions. We need to understand those conditions so that if the conditions change, which they will, we can then shift policies.

So -- and that's the final bullet.

Alternatives.

117

Well, what we've been talking about and I'm sure you'll hear more in the afternoon session is various alternatives; you know, this Alternative A, B and C technologies, biomass, wind, solar, nuclear, transmission lines, energy efficiency, demand response, whatever.

I think it is probably as important if not more important to think about more policy alternatives. How do we set up a structure so we get the right mix of answers because there is not one answer. I think that should be clear. There is not one right answer. There is not two right answers. There is a grouping of them, a vector of answers.

So what type of policy, such as, cap and trade or taxes or whatever will get us to achieve our objectives because I think answering those questions or that next level of policy questions is actually more important. Just because solar is a good idea doesn't mean we should start mandating solar. Maybe we get to solar through a cap and trade or rebates and so forth.

118

Not only must we consider the individual policies, but also their interaction; how does cap and trade interact with CO_2 or sulfur dioxide and so forth; how do rebates on energy efficiency affect regional transmission policies. Not only must we think about the policies within that little policy, but how it connects to everything else that is going on at a state, regional and national level.

So hopefully, I was quick enough. Let me see if there are any answers that I can question.

VICE CHAIR HANNA: Thanks very much.

Yes, Joe.

MR. SPATOLA: I have one question, Dr. Felder.

Do these economic market realities really basically drive any new industry to different sections of the country where there is lower energy density; and, does that kind of preclude New Jersey from being a site or region where industry could look for establishing a base here?

119

DR. FELDER: Yeah, but I -- I agree, New Jersey is a high cost -- particularly from an energy point of view, a high-cost state compared to Idaho, but those factors have been around for 40 or 50 years. If you take the train, you see empty mill after empty mill and so forth, the abandoned factories.

Where New Jersey and other states need to provide value is add a lot more value for their input; so that's on the technology side, on the productivity side, services and that type of stuff. And let alone in the United States, think about internationally, the movement -- you know, the mill that moved from New Jersey to South Carolina is now in the Philippines. I mean, that has been going on for 50 years.

Obviously, we can't be oblivious to energy prices. People aren't coming here with large industries, but I think that day may have come in the past. There may be some exceptions where the additional value of the labor force because it's highly educated, highly trained can overcome the amount of

120

energy the industry uses. But those are higher-value jobs.

Now, of course if we build a nuclear power plant, that would look differently, but that would be in terms of a large-scale industrial society here. I mean, there would be some exceptions; that, would be one of them.

MR. SPATOLA: Is it a given that

we'll end up seeing in New Jersey a greater decline in manufacturing and industry because of this situation that we're in with energy and with greenhouse gas regulations and --

DR. FELDER: I think when you mean industry, I think you're talking about large manufacturing type, heavy industry.

MR. SPATOLA: Yes, I am.

DR. FELDER: Now, if you bring in commercial or high technology or other parts of, quote, industry, then that's where New Jersey has a competitive advantage because of its labor force and so forth. Those trends of the loss of the manufacturing base are 40 years old, if not older. I don't see anything -- you know, I don't see anything

121

reversing those trends.

I don't think that what New Jersey is trying to do on the air emission side or the environmental side or clean energy side accelerates that trend; in fact, it may reduce it because if we can combine the high-tech engineering training with those new technologies, I think that's where New Jersey can grow.

MR. ZONIS: One of the problems that continues to come up and must be frustrating for people who are trying to answer the questions that you propose is the Not in My Backyard Syndrome.

The most recent one that comes to mind is the major electric supplier wanting to build a high-voltage transmission line from the western part of the State across many communities with practically revolutionary responses all the way across the map.

How do we continue to resolve those and come up with the alternatives to answer Question 2, as well as Question 1?

DR. FELDER: I don't see really a way out of that without states giving up their

jurisdiction to the federal government, which there has been some movement at the federal level with the 2005 Energy Policy Act or thereabouts, let alone at the local level.

I think the new Administration's approach, like everything is to put a lot of money to that problem. You saw it on the nuclear side with waste storage; that's just another poignant example of not in my backyard.

We design democracies for participation and input, not because of efficiency; so that may have to change over time. Eventually either prices will continue to rise, reliability will start to suffer and at some point, you know, society will be confronted with that trade-off.

So in many cases, we have to wait until a crisis occurs in order to solve the problem, you know, just go down the list; so it is very difficult to anticipate, that's why you're here and I'm here.

MR. ZONIS: I'm going to be parochial in my view despite your warnings not to do so.

The projections that we have in terms of our energy demands were made before we experienced this significant economic change.

If you were to do a sensitivity analysis on those projections, how much do you think that we could be off in what we think the projections were going to be versus what they are going to be if we do have a new economic paradigm.

DR. FELDER: That's a great question because when we completed the Energy Master Plan in the State, it was literally two weeks before oil prices went from 140 to 50 dollars.

The way I think about it, and after I do the numbers, maybe I can provide them, is I think we'll have two to four years

of flat-line growth roughly and then we'll
continue, assuming the economy rebounds at the
level projections, you know, the 1 to 2
percent a year; that's the way I think about
it.

In other words, it will delay us.
It moves us out, just take Mike's numbers and

124

readjust the scale by two years, hopefully one year, but maybe three years.

MR. ZONIS: I'm glad for the optimism.

VICE CHAIR HANNA: One more.

Go ahead, Mike.

MR. EGENTON: Real quick, a lot of discussion about green jobs, green economy and looking to that nexus of the -- you know, the old manufacturing bases left here at the State.

Is Rutgers working on or collaborating with the State, Hughes & Seneca talked about it, about tracking that new type of manufacturing sector, the folks that construct the solar panels, the folks that build the wind turbine; and, also, on an academic level, a core curriculum of teaching people how to do that, as well as on the labor side of the equation of building it and enhancing that job force.

DR. FELDER: Rutgers is trying to do that both on the labor force with the Heldrich Center and we're a little bit involved, but that's the area of expertise,

helping design curriculum at all levels at the high school, vocational, community college, graduate level.

Also, it's tough with the energy efficiency measures that the BPU is putting in, we're calculating green jobs associated with that.

The one big kind of a difficulty has been getting that solar installer or assembly plant here in New Jersey because other states are competing for those jobs, as well. So there is kind of a -- I hate to use the word arms race, but between Pennsylvania, New York, and so forth. And that really requires a nexus, I think that's the right word, a culmination of energy, economic and environmental policy.

New Jersey has been trying really with the solar because of large installations relative to the number of people, hopefully that will continue and then we'll be able to land even more jobs on the manufacturing or assembly, not just in the installation because those are the higher-value jobs.

VICE CHAIR HANNA: Thank you very

much, Dr. Felder.
I should mention, Frank, you're welcome to join us for lunch. All invited speakers can join us for lunch up on the sixth floor. I know we have more questions for you so if you're available...
DR. FELDER: Great. Thank you very much. I just don't believe in free lunches so...
(Frank Felder, Ph.D. was excused.)
VICE CHAIR HANNA: Sean McNamara is here from PJM. Sean, I'm sorry to do this to you, but you're the one standing between us and lunch and we're a little late, but we're glad you could join us.
Sean is the manager of Regulatory and Legislative Affairs. We've been talking about PJM. Hopefully you've been here a little bit and you've seen your name taken a few times.
MR. MC NAMARA: I have, I have.
VICE CHAIR HANNA: We definitely appreciate you being here and are glad you could come.
MR. MC NAMARA: I have two tough

127

challenges today. I have to follow Dr. Felder, who is always impressive; and then, to your point, I'm standing between you and your lunch so hopefully I won't hold things up too much.

Thank you for inviting PJM to speak here today.

Today's hearing is focusing on the need to balance the mix of electric-generating options in New Jersey to improve air quality and address climate change.

PJM agrees that air quality and climate change are significant issues that do need to be addressed and we appreciate the work the Clean Air Council is doing to help New Jersey address those problems and we agree to work with the Council and the State of New Jersey in improving in both of those areas.

You've heard PJM mentioned a couple of times today. Well, PJM is the regional transmission organization that serves all or part of 13 states and the District of Columbia. Our job is to ensure the reliability of the bulk power grid and to

128

operate a competitive wholesale market for electricity serving more than 50 million Americans. We do this by operating the electrical grid to meet the highest level of reliability standards, administering a day-ahead and real-time market and planning for the long-term adequacy of the bulk transmission system.

PJM's No. 1 priority and the priority that drives all of the decisions that it makes is reliability. In order to ensure that the transmission system remains reliable, PJM uses an open process called the Regional Transmission Expansion Plan to study the transmission system to identify what changes or additions to the grid are needed to ensure reliability and the successful operation of the wholesale markets.

As the Federal Agency Regulatory Commission approved Regional Transmission Organization, PJM's RTEP process covers a region that encompasses more than 164,000 square miles in 13 states and the District of Columbia.

PJM's RTEP process includes both a

129

five year and fifteen year dimension. The results of the studies performed by PJM staff along with the recommended upgrades required to address reliability, criteria violations are submitted to PJM's independent board of managers for the PJM board for approval. Once approved, the upgrades become part of PJM's overall RTEP.

The independent nature of PJM's board cannot be overstated. This requirement of our operating agreement ensures that decisions made by PJM about the transmission system are made without undue influence from any PJM member or stakeholder.

PJM's RTEP process is holistic. The studies consider multiple inputs including load forecasts, market efficiency analysis, generation projects requesting interconnection to the grid, which include renewable generation, generation deactivation and retirements and demand response and energy efficiency.

PJM does not control which types of generation resources are proposed to be built or retired, nor do we have a preference

130

for or advocate for any certain type of generation. PJM can be considered a generation agnostic or neutral organization so we will not be making any recommendations or suggestions on which types of generations should or could be built.

However, PJM provides the process

through which resources are added to the grid and the markets where they can participate. PJM's 2008 RTEP, which was released on February 27th shows that more than 6500 megawatts of new generating resources are under construction with another 85,000 megawatts active in our queues. These generation additions and potential additions improve system reliability and generation supply, as well as the competition within PJM's market.

More to the point of today's hearing, PJM is an enabler of diverse generation resources. The RTEP process offers a structure that assures consistent opportunity for development across fuel types.

More than 59,000 megawatts of renewable technologies are active in our

interconnection request process. Interconnection request totals through January 31st of this year include 55,000 megawatts of wind generation, 600 megawatts of methane, 500 megawatts of biomass and 2700 megawatts of hydro.

The potential impacts of these renewable sources of generation cannot be underestimated. As an example, an increased penetration of wind power shows the potential for mitigating wholesale prices while providing significant CO2 emissions reductions.

With 15,000 megawatts of wind capacity installed, wholesale market price reductions of $4.50 to $6.00 a megawatt hour, which translates to reductions in annual market-wide expenditures of between $3.5 to $4.7 billion.

Displacement of about 43,000 gigawatt hours of fossil-fueled generation with about 60 percent of the displaced generation being coal and the remainder being natural gas and oil-fired units.

And that 15,000 megawatts of wind

capacity, if installed, will generate CO2 emission reductions of almost 35 million short tons in the absence of any CO2 price.

So given our neutral stance on generation sources and our proven methods to provide the way for diverse generation types to connect to the grid and to participate in our market, PJM should be seen as an enabler of renewable generation sources and encourages the development of more renewable sources of electricity. This will not only assist New Jersey in achieving its air quality and emissions goals, but will improve the reliability of the grid, as well.

The fact still remains that PJM is a Regional Transmission Organization, which is responsible for the bulk transmission system.

In total, more than $13 billion of new transmission lines were approved by the independent board since 2000, all of which is in various stages of development. Part of this investment is for the interconnection of new generation and part of it is for addressing the reliability requirement of the region in light of ever increasing growth in

demand for electricity.

New Jersey's native load growth over the next ten years is projected to be around 1.6 percent per year, which is down slightly given the downturn in the economy. Even with the downturn, the trend for load growth is still moving upward.

To address the growing demand in New Jersey, PJM has identified numerous upgrades and is working closely with the transmission owners that are responsible for building the facilities. Among the more significant upgrades is a new 500 kV transmission line from Susquehanna in Pennsylvania through PSE&G's Roseland station in New Jersey. This line will address 23 overload conditions on 230 kV and 500 kV transmission lines in the New Jersey and Pennsylvania area, making the system more reliable and keeping the lights on in New Jersey.

New and/or upgraded transmission lines, as I said before, also enable renewable sources of energy to reach loads. The fact of the matter is that most of the areas in the

United States where renewable sources of energy are located are not in the areas where the energy is needed and that makes a case that additional transmission lines will be required in order for the energy to flow to the load; therefore, the Clean Air Council will be advocating for an increase in the use of renewable resources. To achieve its goals around air quality and climate issues, new transmission lines and upgrades will be needed.

The Susquehanna-Roseland line proposed for northern New Jersey will not only relieve grid congestion and improve reliability, but will also enable clean generation resources both within New Jersey and outside its borders to participate in PJMs.

So we encourage the Clean Air

Council to consider what PJM has provided and include as part of its overall recommendation a provision for the development of additional high-voltage transmission.

While PJM is neutral in the type of generation that is proposed, building a

baseload plant in New Jersey will help close a supply and demand gap in the State, decrease the State's need to import energy, obviously, improve the reliability of the grid and reduce electricity prices.

While improving the energy situation in New Jersey, new baseload power could also assist the State in meeting its highly aggressive reductions in greenhouse gas emissions and assist in improving air quality.

We encourage the Clean Air Council to support the energy master plan's consideration that adding additional baseload generation is needed in the State and believe that noncarbon-emitting solutions, such as nuclear is one possible solution.

PJM believes that demand response and energy efficiency will also play a very prominent role in the generation mix going forward and suggests that the Clean Air Council give great consideration to demand response resources and energy efficiency when making their recommendation.

The best and most cost effective means to reduce emissions and improve air

quality is to reduce the amount of load on the system. The cheapest and cleanest megawatt of energy is the one that is not needed.

Demand response is the ability of electric consumers to control their costs and reduce their electric loads, often during times of high congestion and high prices, thus reducing the amount of electricity that must be supplied.

PJM has a significant amount of demand response already participating within its footprint. There are 4620 megawatts of demand response committed as capacity resources for the 2008/2009 delivery year that began June 1st of 2008. We are working hard with our members and our stakeholders to increase the use of demand response.

PJM is looking to develop a price responsive demand product and to put into place the infrastructure to support it and enable it. PJM is also looking to develop a CO2 displacement certification for implementation in our Generator Attributes Tracking System or GATS to increase the participation of demand response resources in

137

our market.

Energy efficiency is once again surfacing as a viable alternative to building new generation sources. By definition, energy efficiency is the installation of more efficient devices or equipment or the implementation of more energy efficient processes or systems. These devices or systems meet the requirements to exceed building code, appliance standards or other relevant standards during the time of installation.

PJM is also working to increase energy efficiency usage across the RTO. Starting with the 2012/2013 base residual auction later this spring, energy efficiency can bid into our capacity auction and, if selected, receive a capacity payment or revenue stream over a four-year period of time.

As part of our testimony today, I am submitting a report PJM completed in January of this year entitled, Potential Effects of Proposed Climate Change Policies on PJM's Energy Market.

138

PJM recognizes that legislation to reduce carbon emissions is coming and will have a significant impact, not only on PJM, but also our members and their customers. This study was undertaken to help inform decision makers in Washington and elsewhere on how climate control proposals will affect the wholesale market and wholesale market prices.

When you read the study, you will see that it has many conclusions on what the varying price levels for carbon will do to the market, consumer's bills and for carbon reduction; however, the study also shows that a significant mitigation of price impact occurs through increased demand response and energy efficiency so a 2 to 10 percent increase in energy efficiency measures can reduce wholesale prices of up to $18 billion per year across PJM. A 2 to 10 percent increase in energy efficiency measures also results in 14 million to 60 million tons of emission reductions.

The desired outcome of our effort is that PJM will see a significant increase in the amount of demand response and energy

139

efficiency that has been offered and selected in our RPM capacity market. These resources will not only increase the reliability of the grid, but will also contribute heavily in the process to reduce greenhouse gas emissions. PJM encourages the Clean Air Council to consider greater levels of demand response and energy efficiency when developing their recommendations.

So once again, PJM appreciates the opportunity to share its thoughts to assist the Clean Air Council in making their recommendations. From the testimony provided, PJM believes that reliability needs to be the first consideration giving the need of and the ever increasing demand for electricity. Aside from that, a holistic approach is required and should include transmission, new baseload generation and ever increasing amounts of demand response and energy efficiency.

Once again, thanks for inviting me and I will do my best to answer any questions that you may have.

VICE CHAIR HANNA: Thank you very much, Sean.

140

We'll take a question or two before we break for lunch.

DR. BLANDO: You may have alluded to this and I want to get a little more clarification.

In terms of utilization or

increase of utilization of energy efficiency,
how does that affect the bottom line for PJM?
I mean, is it reasonable to think
that if people become more efficient, there is
less going across the grid and therefore you
will take a hit in your profit?
MR. MC NAMARA: Well, PJM is a not
for profit.
DR. BLANDO: I see.
MR. MC NAMARA: So we don't
operate to generate profit. In an operations
sense, we can be considered the air traffic
controllers of the grid. We are just making
sure that supply and demand are met and
contained; and then on the other market side,
we could be considered like the NASDAQ, where
we just provide a marketplace for our
participants to trade their product.
MS. MOUNT: With all this

discussion about technology and energy
efficiency, what are you doing to upgrade or
change the transmission lines to be more
efficient, to have less problems with
diminished --
MR. MC NAMARA: Line losses and
transmission losses.
MS. MOUNT: Yeah, and also maybe
put them underground or do something that gets

rid of this idea that people are going to be fried if they live near a transmission line.
MR. MC NAMARA: PJM makes the recommendations to build the line and we work with the transmission owners, assisting them to get, you know, passed through the regulatory process, but we don't really make recommendations on what lines, how they should be built, where they should be built. We just know that the areas where the congestion is, where the need for the line goes and then we work with our transmission owners and they're the ones that develop those plans.
MS. MOUNT: Do you see anything happening in that direction?
MR. MC NAMARA: There are some

things that have developed. I know that the PATH (ph) line, which is down in the southern portion of PJM is looking at -- as it crosses through the Chesapeake Bay is looking to convert it from an AC signal to a DC in order to get it through to the other side; that's going to help with line losses. And it's easier to -- it's easier to run those lines underneath the water than it is from an alternating current perspective. I mean, there are some developments that are coming. I can get you more information on that if you would like.

DR. BERKOWITZ: I have a question about demand response.

Certainly on high energy demand days, I can understand that air conditioning can be cut back to minimize demand response, but I take it that you're talking about a much broader demand response than just that.

Without revealing any trade secrets, can you give us some examples of what you've encountered or what your understanding is of where this improved demand response could come from; that is, it would be

143

convenient for the Council to be able to say, Everybody should throw out that 20-year old refrigerator, but what other examples can you give us in that direction.

MR. MC NAMARA: PJM has a couple different programs. One, just to mention one, is our interruptible load for reliability where we actually have members of PJM that will -- to the point somebody said earlier -- come off the grid. So they'll move their operation to another time, they won't run their operation during that high-peak period to pull a significant portion of demand off the system.

We're seeing a lot of work with

curtailment service providers in working with consumers at some smaller businesses to pool together a larger portion of demand response.

We're working on trying to get price response and demand so you've heard of smart grid, you know, enabling consumers to see the cost of energy as they're consuming it and to make smarter decisions around maybe I should run my dishwasher at 11:00 at night rather than 3:00 in the afternoon because of

the price difference between the cost of energy so there is some significant work moving forward.

DR. BERKOWITZ: Thank you.

VICE CHAIR HANNA: One more.

MR. ELSTON: I understand your board are your members?

MR. MC NAMARA: That is incorrect.

MR. ELSTON: Pardon?

MR. MC NAMARA: That is incorrect. Our board is independent of our members. So we have a board that cannot own any financial stake in any of the members of PJM. If they do own, they need to divest them within six months and that goes for employees, as well.

MR. ELSTON: The question I have in a broader respect is the make up of that board.

Does that include advocacy groups, members of the environmental community; can it, should it?

The question is: Where are the limitations and perhaps how is your board selected in the first place?

MR. MC NAMARA: The board is not

made up of any of our stakeholders; however, we do have a stakeholder process where environmental groups, consumer groups can become members of PJM and participate in our stakeholder process so that their concerns, their wants and desires can be expressed to our board. We have, we have --

MR. ELSTON: And the board itself, I was curious, members of the board, could they become a member?

MR. MC NAMARA: Not that I'm aware of. We have a board search process whenever a board member goes off and he is going to be replaced. This process goes out and searches for viable candidates to become part of PJM's board.

MR. ELSTON: But they're not prohibited from it?

MR. MC NAMARA: They're not prohibited, not to my knowledge, but there hasn't been --

MR. ELSTON: But highly unlikely?

MR. MC NAMARA: I would assume so, yes.

VICE CHAIR HANNA: Once again,

thanks very much, Sean.

(Sean McNamara was excused.)

VICE CHAIR HANNA: We are going to break for lunch and maybe we'll split the difference. Why don't we do a half an hour for lunch and we'll be back here at 12:45.

Thanks everybody.

(Luncheon recess: 12:19 p.m. to 12:52 p.m.)

147

A F T E R N O O N   S E S S I O N

12:52 p.m.

VICE CHAIR HANNA: Good afternoon everyone. We're trying to get back on schedule here. Let's get started again, if you could take your seats.

Our first speaker after lunch is Bill Levis, who is the President and Chief Operating Officer at PSE&G Power.

Bill has been in the power industry, he has just been telling me some of his background going all the way back to his high school years and his interest in energy, over 25 years of experience in the power industry and serving PSE&G Power, which has three main subsidiaries, PSE&G Fossil, PSE&G Nuclear and PSE&G Energy Resources and Trade.

Welcome, Bill. Thank you very much for your time today.

MR. LEVIS: Well, good afternoon, everybody. I do appreciate the opportunity to talk today. And I'll tell you, I have been impressed with the array of speakers thus far and the topics that have been presented. And I recognize the special challenge this group has, which I would say is to take what looks like a number of competing interests and needs and make them complementary; and when that is done, I think we can truly make progress on this important issue that I think is decades in the making.

So I put this slide up to talk about our company's approach to climate change. I am not here to talk about all three legs of this, but we often talk about the three-legged stool; that is, the need for renewable energy, the need for conservation and still the need for clean central station power. Some folks you've heard refer to that as baseload power during the course of this morning's discussion.

I would say we endorse all three equally. We believe that all three need to be done. There is no silver bullet to this issue that we're dealing with, no single solution and it's going to require progress on all three fronts, but I'm not going to talk about the conservation piece or the renewable piece because there are other parts of our company that are dealing with that.

149

I am going to talk about the clean

central power and the need for that as we look at options and in consideration of that and how we make that decision.

I thought I would start first with just a picture of electricity generation in the country on the left and then New Jersey on the right.

There are a couple of points I would like to make. If you look from a baseload generation standpoint, essentially you have three options in New Jersey, although there are four in the United States; and that is, coal, which you see is 49 percent of the nation's power, which is why I believe you cannot walk away from coal without having significant and drastic effects on our economy; natural gas, which is 20 percent; and nuclear, which is just under 20 percent and you see the hydro contribution there.

I heard some comments this morning about the best plant is the one that does not have to be built. And I can think of no better example of that than the nuclear story. And I say that because its contribution is

150

just under 20 percent and it has been that for probably a decade now and that essentially absorbed the growth that we've had in electricity consumption in this country.

So the improvement in nuclear operations over the last two decades essentially obviated the need for over 20 new nuclear plants so it's clearly a case of being more efficient, being more productive is a real-time case for reducing the need for additional plants. For the ninth year in a row, the nuclear industry had a capacity factor of greater than 90 percent just in this past year.

On the New Jersey side, I point out you heard again today that in New Jersey greater than 50 percent of the energy comes from nuclear, which is why as we deal with climate change as an issue, transportation has to be dealt with because transportation in New Jersey is actually the biggest contributor of greenhouse gas emissions. And you see the contribution for natural gas is actually greater than coal in this state and still the contribution from coal is about 16 percent.

This is a picture of actual generation in 2007 so that's what actually ran.

The next slide will show you essentially what was available from a capacity standpoint in New Jersey and it takes us back to 1990.

A couple of things that I would

point out here from a baseload standpoint, what you see in the blue is natural gas generation and you can clearly see that natural gas has been a bigger and bigger contributor to capacity in the State.

You can see the orange, which is nuclear has been relatively flat.

Coal, which is the black has been relatively flat and essentially you see the drop in oil along the way.

Now, if I were to update this for 2009, there would be a couple additions; one, is our Linden plant, which was 1000 megawatt combined cycle, natural gas, that got added in 2006 and recently added 200 megawatts of nuclear capacity in the past year so there would be some change in the blue and the orange, but essentially the other ones would

continue with the trend you see there.

Now, I showed New Jersey capacity and now this is the PSE&G power piece. And a couple of messages that I would like to leave here. One is there is some assets in New York and New England included in this 13,000 number that you see there, but the majority of those are in New Jersey and PJM.

The second thing and I tell our employees this, too, is what we saw last year firsthand was the value of having a diverse fleet of assets; that is, different types of power plants with different fuel sources because just in the course of this last year, we got a chance to run them all. I say that because if you roll back the clock to last January, we essentially had relatively low gas prices, relatively low coal prices. During the course of the year, we saw gas go up by -- you know, more than double. We saw coal moderately increase. And by the end of the year, we saw gas collapse, oil collapse, coal be high so we were actually running oil plants at the end of the year and in the beginning of the year and saw in someplaces gas displace

153

coal.

I say that because although you see the title about predicting the future, none of us can do that. And all I know is having a diverse asset base allows us to take advantage of whatever is available or frankly not available at that time because if I were heavily dependent on natural gas and I was talking to you after Hurricane Katrina, it would be a much different story because we lost a significant amount of natural gas capacity at that time.

So you can see what is available

from a fuel diversity standpoint. And you see gas is about half of our portfolio; but when it actually ran, you see a bigger contribution from coal because for the most part it was a lower cost of producing electricity during the last year.

I put one little note, if I see a pump storage facility so when you look at opportunities to shave the peak, this is actually an excellent facility to do that. This is a facility that takes a pond of water essentially, pumps it to another pond at a

154

higher elevation at night when the prices are cheaper and during the course of the day the water runs through a water turbine. And this is a 400 megawatt unit that is actually run during peak hours of the day so it helps to shave the peak and reduce prices during that period of time.

The only other item I would point out is the energy produced last year was a record production year for us. So we generated more megawatts from our fleet, that is aging, last year than we ever had in the history of the company.

So I just wanted to put this up here. We look at the Energy Master Plan just like everybody else and we want to make sure

that when we see our share of that, that we
are there to meet the needs. And what I
wanted to say here is on the left you see
projected generation by the various types
available and on the right is the PSE&G Power
piece for nuclear, coal and gas. And if you
look at the -- you will see just over 60,000
megawatt hours needed on the left there and
you can see us, you know, with our portion of

155

that so I would tell you from a baseload
capacity standpoint, we think we're well
positioned to meet the needs in 2020.
Now, we generally say, What is our
strategy for there and beyond. It's not all
that complex. It really is getting back to
some of that economic efficiency discussion we
heard this morning; that is, getting the most
of our existing assets so we've made
significant investments and I'll show you a
couple of them in our existing units and then
operating units we have with excellence that
means better than anybody else, and
measurements on a number up front, not just
reliability, but cost wise, safety wise and
significant environmental measures and doing
it at the same time in which I call an
environmentally responsible fashion to
minimize our impact on the environment.

Just to highlight a few of those investments, $440 million in extended power upgrade and steam generator replacement, one has increased the output altogether from those two units by 200 megawatts, which we had available for the grid this past summer and

also sets us up for license renewal and that the major capital expenditure for major components should not need to be replaced for the entire 60 years that we expect from the units.

In addition, we are pursuing license renewal. We've been working on that project for almost two years now and expect to submit our application to NRC in August of this year to extend the operating licenses for Salem and Hope Creek by an additional 20 years. Just so you know the licenses for Salem Unit 1 expire in 2016, for Salem Unit 2 in 2020 and Hope Creek in 2026.

On the coal side, we've made significant investments both for our environmental retrofits at our Hudson and Mercer stations. Those include things like scrubbers, SCRs, baghouse filters (ph), which deal with SOx, NOx, mercury and particulates; but, also, another several hundred million dollars in reliability improvements so that the unit will operate reliably when those environmental retrofits are also accomplished.

The natural gas side, we talked

about the Linden plant that we finished in 2006.

We had some discussion this morning about the high electric demand days. We are positioned at this point to do three things: One, is we will bid new capacity in the upcoming May RPM auction to replace some of the older units. We have an operating protocol so we can balance kind of the price objectives and environmental objectives when we operate those units. Some of those units, frankly, we will retire by 2015. From a numbers perspective, that's about 2000 megawatts that will be subject to retirement in the next half dozen years.

It makes sense that we did install water injection or actually are installing it today. It's not something we're waiting for 2015 for. A number of our units will actually be done this May.

If I rolled the clock back a little bit, you saw that natural gas blue line going up, we've added 2300 megawatts of natural gas generation since the year 2000.

I mentioned before about operating

with excellence and that is to make sure that we are getting the most out of our units each and everyday that the heat rate is as efficient as it could be, the force(ph) loss rate and the time that the plant is off line is reduced. And this just shows a couple of the slides relative to nuclear output, which has continued to increase at the station. We've had three years now greater than 90 percent and finished last year just over 92 percent. In the increased generation, you see there is actually a function of having those additional 200 megawatts available all year this year versus just half a year last year.

On the coal side, you will actually see output being reduced over the last couple of years and that's frankly because of outages we have taken to put in the back-end technology investments that I referred to before.

So on significant outage days, to put in those reliability and environmental improvement enhancements that I talked about, but we essentially finished Mercer this year.

We finish Hudson in 2010. And we believe the units will be well positioned to have an improved output.

And the bottom reflects our combined cycle fleet and certainly you can see, as we talked about, natural gas being a bigger supplier than coal in New Jersey, you can see that directly from our own fleet where essentially from 2005 to 2008 we almost tripled the output from our combined cycle plants.

This is actually a slide that we're fairly proud of, Power, because you see two lines, the blue line represents our generation so you can see a continuous, essentially, a trend in increasing the output from our stations; the red line represents the emissions from them. Now that's just SOx and NOx. It would be a similar story for mercury and particulate if it were there, too.

So you can see we were able to increase our generation and reduce our output at the same time. Now, we can do that, quite frankly, when we work together in understanding rules, there is a common

160

platform nationwide so we can work together to get to this end.

I will say CO2 will be much more

difficult than this because some of these things were power-plant dependent and CO_2 has got many more tentacles to it than just generation if we're truly to make progress in this area.

The other thing I point out, too, if you look at that blue line that essentially flattens out, too, because if you look at what it is we were able to get out of our units from an efficiency stand point, we're almost tapped out at that point so it does call for what is next then.

So the "what is next" discussion is an interesting one. I particularly like the gentleman who talked about sometimes there are more questions than answers. These are just questions we ask ourselves everyday as we work through and decide what the best investment is.

You heard about transmission; how much will be built and where will it be built, which is important because if we look to where

we site our units, some are more advantageous than others.

What will the price of carbon be; it could be to the point where it will rule out generation sources and make others more economic.

Interconnect costs.
I can build a plant, but I have still got to connect it to the grid; what is it going to cost to do that and will I be subject to the same rules of all other generation types.
Will we electrify transportation; and if so, that changes the -- you know, when is power required; how are you going to supply it overnight, if that's in fact when we are going to do it; how successful will the demand side management be.
What fuels will be available; you know, we hear about natural gas and the Marcellus shale and whatnot and, you know, how viable is all that; will we get that and at what price will that be?
And, frankly, at the end, what will be that next technology break?

162

I mean, with the right set of rules, we're a bunch of clever folks in this country and we will figure out something here.
To the extent we can answer these questions and provide some certainty, it helps us in our decision making because these are not -- despite what some folks might think, are not huge, you know, economic windfalls at first, but we are trying to make 40, 60, 80

year decisions on some things that can change when the next election comes. Those are some of the challenges that we're faced with here today.

So one of the things that we believe is very important, and I said this before, is diverse-unit types with diverse fuel capability.

Natural gas, you know, has got a lower CO2 footprint than coal does. What folks may not recognize is those very cold days of the year, we don't have gas available at the gas plants because the residents get gas first. So those very cold days of the year, you'll see our gas plants running on oil, but the fact that they have dual fuel

163

capability means they can at least run and meet the needs of the customers during those very important days.

Obviously, a disruption in gas and having that ability to run oil is helpful, too. So if you look at 80 percent of our units, they have essentially dual-fuel capability in the mid-America peaking area, which I think is very important.

So a couple of things, as we look at these 40, 60, 80 year assets; in 2030, 75 percent of New Jersey coal will be greater than 60 years old. In fact, some of our coal plants today are older than 60 years old. So when I say, you know, how long and how far can we continue to push these units is something we deal with everyday.

In 2030, three out of the four nuclear plants will be greater than 50 years and Oyster Creek will be greater than 60 years old, which means as its license renewal works through the process with a 60-year life, it will still have extended that an additional 20 years by 2029.

I put this graph on the bottom

164

because when we look at where do we get it from, there are some other important considerations here because one is how long does it take.

So if I start at the bottom first and I talk about we are going to bid some peaking units that's into the May RPM auction, which is for delivery years 2012 and 2013 so essentially to build a peaking plant, which is the simplest version of the power plant out there, a three and a half year process.

If you look at it, most of the time is licensing and permitting and you will see that same story through all the various technology types.

If I were to put it in from a
numbers perspective, a peaking plant about
$100 million and so it is no small investment
and that's for just under 100 megawatt output.

Combined cycle plant, a little
over four and a half years, about a billion
dollars for 1000 megawatt facility.

Coal, I don't even want to guess
at this point because there are rules there of
what you can build and what it will look like.

I mean, there are some interesting
technologies out there. We have just got to
demonstrate that they can work and they are
true option for us in the future.

Nuclear, you can see, you know,
how long it takes to permit and build one of
these facilities and you can guess at the
cost, but it's 10 billion plus; that number is
significant in that if you look at the value
of our company, it's essentially worth our
company's worth.

So for us to go ahead with a new
nuclear plant is really a bet-the-company
proposition, which means we have to have
established in our minds great regulatory
certainty and financial certainty that we can
deliver this project on time and on budget
because it really is a bet-the-company deal

for us.

I thought I would close and say that, you know, we understand the significance of climate change. It's important to our society and the need to solve it, which is why our company approaches this issue on what I call every known front.

So you see on the renewable side, it is slightly shaded, it is the work we're doing as some folks referred to in solar. CAES is actually compressed air energy storage where we're looking to be able to compress air underground and use that during the peak time. Off-shore wind, the efficiency filings, LEED-certified buildings and the like. These are all efforts that are undergoing in our company.

And on the power side, we are focused on getting the most out of the assets that we have, which means making investments where we can to increase the output, operate them better than everybody else and at the same time reduce our environmental footprint.

I talked about license renewal, which is well underway and that application will actually be in August.

We've taken the first steps to look at new nuclear and that means we are working on an early site permit, which essentially would certify the site, you know, with the ability to build another nuclear plant. We started that work in the fall. We

expect to submit that application to NRC in 2010 and have anywhere from a two to three and a half year approval process for that.

And another thought that I would like and I know you folks look at the air piece, when we look at the environment of this, we have to look at air, water and land; and so, you know, there is no perfect solution that there are enough checks in all those to the extent that folks would like, but when we look at the three of them and balance the needs here, we can't see us going forward and meeting any of these goals without nuclear being a piece of that picture, which is why we've taken that first step which is a $100 million investment to be able to have that option moving forward.

With that, that is the end of my prepared remarks, but I would be glad to answer any questions you may have.

VICE CHAIR HANNA: I am sure we do have a couple, Bill. I know I have one to start with.

Your list of questions is great;

that's a lot of good information to kind of

guide us as we try and prepare our recommendations and conclusions from today.

I guess I would ask for a little bit of help on -- to answer some of those questions and get the right answers to those questions, what do you see as signals from the marketplace or from the policy developers, either state level or federal level, what are the right signals that we should be recommending to make those -- to make a response to those questions right?

MR. LEVIS: What a tough question.

VICE CHAIR HANNA: I'm sorry.

MR. LEVIS: There are actually a lot of things. From a big picture perspective, what I tell folks is I just want a level playing field. I want to be able to have one type of generation compete against another.

So what does that mean; that means that folks shouldn't get preferential treatment for interconnect costs, that I can hook up for free, but you have to pay; some kind of program where -- I think RGGI is a great thing that is going to help us, but frankly disadvantages us for those west of us because it's not a common set of rules for all the players in the game. Unfortunately, there are not state boundaries with respect to how electrons float here.

So we really do need some federal common set of standards for how we do business here because for us to compete, we've got to be able to compete with the same set of rules.

So there is, I guess, two answers for that: One is the policies that support it on both a local, state and federal level, they have to be aligned; and then specifics, whether it's cap and trade or whatever, it's got to be the same for all.

VICE CHAIR HANNA: Thank you.

DR. ZHANG: In terms of solar contribution, I know it's very small, but do you have like a number or generation population in public buildings or residential buildings that otherwise would assume the electricity.

MR. LEVIS: I don't. I can find out from those in our company that do that, you know, what their assumptions are in there.

Another thought I would like to

leave with the Council is I think solar and wind are terrific and we should be doing them. There are times, however, when the sun doesn't shine and the wind doesn't blow. And even with our experience in Texas, we have found that where there is significant wind generation, you still have to have a power plant to back them up; one, in case the wind goes away; and two, just from a grid stability stand point because you still have to provide voltage control and frequency control and all those other things so lights don't flicker. Obviously, some manufacturing processes are very sensitive to those sorts of things and wind doesn't lend itself to great stability there. It's a great source of power, but that's why every one of these things has got to be a piece of the answer moving forward.

MR. ELSTON: You referred before about the uncertainties of fuel costs and everything and I was kind of curious. And I assume you buy futures in your fuels for the costs of your facilities.

How far can you go out from that

171

and how far is it possible to go out to that so that the certainty -- that, at least, one parameter gets to be known several years, maybe five years out that you can use that as a predictor for what some of the projects you were talking about might be.

MR. LEVIS: Generally, I will tell you our philosophy there is we buy fuel out as far as we have sold the power.

MR. ELSTON: Which is?

MR. LEVIS: Which is, essentially, if you look at this year, for example, we would say that we are 100 percent hedged and we've contracted all the power that we expect to generate this year already and we have basically locked in the fuel price for this year.

If I look at next year, what you will see is about a 75 percent number; that is, we sold what we believe is 75 percent of the power we can generate and we've hedged 75 percent of that fuel to go along with it.

Now, for the most part, that is nuclear fuel and coal and to some extent a little bit of gas, but, you know, like I said,

172

there is significant volatility in the gas business. And for the most part, the gas units are the ones that we run on a margin, which means essentially the prices that day would reflect what the price of the gas is that day, too, so we don't buy all that much in the future.

But to be honest with you, some of the -- I said, we hedged fuel in coal. We had all our coal suppliers last year renege on their contract, every one of them. So we had a deal for coal, but folks saw the price of coal going up and they said, We're not going to sell it to you at that price anymore. Basically, across the board, they did that.

Some of them were foreign coal suppliers. And so, you know, in dealing with foreign governments, you can imagine how all of those negotiations go. They are not easy.

Essentially, I can tell you I hedged the fuel; but, at the end of the day, folks didn't deliver it anyway so I had to bear the cost of that increase in coal at the same time I had already sold the power at a fixed price.

173

MR. ELSTON: Aren't those hedge prices -- they fixed by contract, aren't they?

MR. LEVIS: Only if you honor the contract.

MR. ELSTON: And they're not honoring them?

MR. LEVIS: We had examples last year where folks did not. We basically got a letter saying, We're not going to give you coal at that price anymore. We know we agreed to it, but we're not going to do it. So I am saying, we had to absorb that cost, but the price of power still remained fixed because we had contracted to sell that over again.

DR. BLANDO: Does PSE&G invest in R&D?

I'm curious what you see looking down the road as the technological advancements that would be of great value to this operation?

MR. LEVIS: I would say generally we do not invest in R&D. I would like to tell our folks that we're an operating company. We know how to build assets. We know how to operate them. We know how to maintain them.

R&D is not our skill set.

Now, where there are opportunities to partner with somebody, we would do that. The case of CAES Technology is one of those. It is Compressed Air Energy Storage. We actually have a joint venture with the gentleman who invented this technology, but I will tell you it's also been demonstrated. He's built a power plant in Alabama. We know it will work. He's got some difficulties to work through, but we see some direct applicability to the plant we currently have; that's where there has been some R&D.

For the most part, I think we monitor it, but just like you cannot know what those breakthroughs will be. I know we've been talking about them for 35 years.

MR. SPATOLA: Just to add to this question.

Is there still some kind of relationship with what is called EPPRE (ph), where you would have some kind of participating role in terms of new technologies or better technologies?

MR. LEVIS: We are a member of

175

EPPRE (ph). We participate in a wide range of initiatives with them, most of them in support of our current plans; and that is, metallurgical issues we deal with on steam generators and reactor vessels.

I know there are new plant initiatives, we're a member of that because we're looking at building a new plant, but not real involved with them relative to the technology side, although I would think on our utility, you know, when the topic of smart grid comes up and what the opportunities are, there are folks on our utility side of the business that deal with them on that.

VICE CHAIR HANNA: Thanks very much, Bill.

(William Levis was excused.)

VICE CHAIR HANNA: Looking at the agenda, you'll see that Mike Winka from the Board of Public Utilities was supposed to be here to speak. Bill will be interested to know that he declined yesterday because he has a meeting with PS regarding solar.

So we're going to move ahead to Chris Archer, who is a Deputy Base Civil

Engineer from McGuire Air Force Base and McGuire Air Force Base is working on a number of energy management issues. They're almost a microcosm of the State. The presentations that I have heard from Chris, it's a very interesting perspective and we welcome his input today.

Thanks for coming, Chris.

MR. ARCHER: Thank you for having me.

What I am going to talk about first is what we've accomplished to date. It is really focused on preservation of resources and then we're going to follow that up with what we're currently doing in some of our plants for the next five to ten years.

I always like to start off with a quote from our Fourth Chief of Staff of the Air Force, General Thomas D. White.

What I love about this is really two things:

One, how eloquently the General was able to tie preservation of natural resources to the mission of the Department of Defense. And it clearly is a very integral

part.

The other thing that amazes me about this is he made the statement back in 1959. This was a good ten plus years before the establishment of EPA and the first Earth Day, but he really set the tone back in 1959 for the way that the Air Force embraces preservation of natural resources.

And this is just an example, if you fast forward about 30 years or so, where the Air Force has set really ambitious goals in several different areas.

It was in the early '90s that the prevention of pollution really moved up to the next level. The Air Force set goals to reduce such things as solid waste, hazardous waste, hazardous waste disposal, hazardous material purchases by 50 percent.

And as you can see, at McGuire and you'll see this across the Air Force, that we not only met those goals, but we exceeded them. In the areas of hazardous material

purchases, in the areas of hazardous waste
disposals, we actually exceeded 75 percent. I
could certainly talk for hours about how we

did that, but we'll save that for another day.
What we also did in the '90s was
we established a very aggressive recycling
program. As you can see over 800 tons per
year are recycled between the base and
housing.
This is what we do every year.
Part of building it into the culture is having
a very aggressive, not just Earth Day, but
Earth Week, a full set of activities
throughout the week to embrace our population
in our enduring theme of preserving resources.
What you see in the top left is
this is where we kicked it off with an open
house at our recycling center. We had a
contest with the kids, toward the right, that
was on Arbor Day, planted over 30 trees base
wide. And the bottom left, as part of our
incentivizing natural resource preservation
across the base, that is our wing commander
presenting a check for $5,000 to the squadron
on base that best exemplified resource
preservation.
Now, we're really starting to
focus our efforts on reducing energy

179

consumption and becoming energy sustainable. We have actually established a very ambitious goal of becoming energy sustainable by 2015.

The question is: Can we do it?

What I am going to do is lay out our plans for how we plan on doing this in just the next five years.

First off, really the tone was set by the Secretary of the Air Force, Mr. Michael Wynne about two years ago when he established the policy for the Air Force to make energy a consideration in all we do. And this was for Secretary Wynne much more than just words. He not only walked the walk, he talked the talk. He led conference after conference, partnering with industry, partnering with the universities and leading the Air Force in this ambitious goal.

First, one of the things that he did as part of this was he established two model energy bases for the Air Force, McGuire being the northern Air Force base and Barksdale down in Louisiana being the southern model energy base.

Secretary Wynne's vision in doing

180

so was that the model energy bases would serve as platforms for applying innovative and transformational concepts to the rest of the Air Force.

A key element of that was establishing clear base lines so as we tried things at McGuire and Barksdale, that we would have clear numbers as to the success of these initiatives.

One of the other things was fully applying AFSO 21 concepts. AFSO 21 is a program that the Air Force kicked off two years back, which was the Air Force Smart Ops for the 21st Century. Basically, the precept of AFSO 21 is that if it makes sense and it has a good return on investment, absolutely do it.

To give you an example, we've had facilities on base where you can invest $100,000 or $200,000 in insulation and it will pay for itself within a year. In the past, we had difficulty getting these funds. The Air Force has actually set aside a billion dollars to support these kinds of initiatives so we're now seeing these happen.

181

Also, as part of Secretary Wynne's program, he is applying this not just to infrastructure but across the board so it's vehicles, it's fuels, it's aircraft ops, cargo ops.

Some examples with vehicles at McGuire, we're already starting to see electric vehicles, we're starting to see low-speed vehicles.

With aircraft operations, a major initiative two years ago was to create a C17 air landing zone at Lakehurst. Initially, when we got our squadron of C17 cargo aircraft, they had to fly down to Charleston to complete a lot of their practice missions. Now, we've reduced that tremendously. We've cut a two-hour flight down to about 25 minutes; there's a huge savings as part of that. This also ties into AFSO 21 in that the $12 million that we invested to make this happen paid for itself within a year.

Finally, also looking to make energy awareness part of the culture in McGuire -- and I touched a little bit earlier how we made recycling and water conservation

and some of the other aspects of resource preservation part. We're now doing that with energy, having forums on base, regular meetings with squadron reps. and key leaders to ensure that it is clearly within the culture with what we're doing.

Finally, what we're looking to do is whatever we can apply at McGuire, we're looking to apply across the Air Force.

Now, the key in reaching this goal of achieving energy sustainability is decreasing consumption. We have a plan in place to reduce consumption by 50 percent by 2011 and then an additional 10 percent by 2013. We're going to talk a little bit in an upcoming slide about how we're going to do that.

We are also looking to establish 5 percent of our incoming energy from renewable sources and at 10 percent by 2013.

We are also looking to demolish a lot of facilities on McGuire so 25 facilities by 2011, 30 by 2013. And very key to this is consolidating operations. Very aggressively, over the course of the last two years, we have

183

gone out and inventoried building by building, looking to consolidate wherever possible; that enabled us to put forth a request for $4.3 million just last year to demolish 19 facilities, which we have now, that's been awarded. These facilities are going to be coming down over the course of the next twelve months.

The other thing that we've paired

this with is that for all new facilities that
we are constructing, we're pushing the
envelope on LEED certifications. So at a
minimum, we are shooting for silver and also
looking for, at least, one of our new
facilities to be gold. This will be one of
the first in the Air Force if we achieve it
and I'm confident we are going to achieve
that.

Another goal that we've
established is to have some energy neutral
facilities on McGuire. So we've already
targeted five facilities that we are looking
to, once again, kind of push the envelope on
reducing consumption and then pair that with
either geothermal or solar technologies to

184

make these individual facilities energy
neutral.

In a nutshell, basically, decrease
consumption, upgrade and rebuild to very high
standards.

Now, this is really kind of part
of why I was extremely excited about coming
here today is that a big part of us reaching
our goal in becoming energy sustainable is to
partner with industry, local universities and
local government.

Back in June, we had a conference

up at Rutgers where we invited industry, invited local universities and much of industry to essentially partner with us and bring ideas to us. Those we are starting to incorporate into our plan, but this is a very key element is that we clearly understand, you know, to reach this goal, we're not going to be able to do it on our own.

There is an awful lot of expertise out in industry that we absolutely are going to rely on, also, a lot of expertise at local universities. We've started to reach out. We've had great conversations with Rutgers,

185

Monmouth, Stevens. Basically, we're kind of looking to the local universities to provide us some innovative thoughts, some cutting-edge technologies that can be applied.

Now, as far as reducing consumption at McGuire, we have for the last about three years been working very aggressively with an ESPC, that is, an Energy Savings Performance Contractor to develop a plan to reduce consumption by 37 percent. This paired with the 18 percent that we've already reduced would help us exceed our 50 percent goal.

Broken down into the four elements, the first is to decentralize our central heat plant, by and far the largest of the initiatives, roughly $34 million worth of new infrastructure, but this initiative on its own will be guaranteed to reduce consumption by 22 percent so it's taking down our central heat plant, taking out the high temp hot waterlines, which run around base and provide heat to 120 of our facilities and putting in localized high efficiency boilers in their place.

The second initiative is $4 million worth of lighting upgrades so replacing, you know, 20 or 30 year old lighting systems with high efficiency systems; also, $7 million worth of energy management control systems; and then, finally, $2.3 million worth of chiller plant upgrades, replacing our current chiller plants with a much more high efficiency unit.

Now, the great thing about the Energy Savings Performance Contract is it doesn't require a dime from the Air Force or the taxpayer. The Energy Savings Performance Contractor gets paid with the savings that result from the reduced consumption.

So they are guaranteeing in this case $5.7 million worth of reduced costs over the period of 20 years; that's how they get paid. If this doesn't produce, they don't make their money so we're very confident in awarding this, which we're looking to do within the next two to three months, that this is going to produce at a minimum a 37 percent reduction in consumption at McGuire.

Let me talk a little bit about

energy neutral facilities. I'm going to focus in on the facility at the bottom, our material control and admin. facilities since that is the one we are farthest along with.

Several of the technologies that we're looking to use, these are off the shelf, nothing cutting edge, solar PV panels on the roof, probably mix that with solar thermal so we get not only electricity out of it, but also some heat out of it.

We're considering geothermal. However, geothermal looks like the pay back may not be there; that's why we're instead considering solar thermal.

We're looking to put a couple hundred thousand dollars into beefing up the insulation to help reduce consumption and we're also in the midst right now of bringing daylighting into that facility.

The last initiative for that particular facility is a waste oil burner. We have an awful lot of waste oil that's produced as part of our functions. Historically, we have basically given that away. We haven't had to pay to get rid of it. We haven't

received money back for it. Instead what we're looking to do is to use a lot of this waste oil to heat our facilities.

Several other of the initiatives that we have ongoing at McGuire is we are looking to establish a power purchase agreement. We have about 16 acres of land that's available and this is land that is near some old landfills, which we are close to having a remedy in place on, but an ideal spot to put solar panels to help power the base.

Another project that we have in the works is a biomass project. Congressman Andrews was able to get $3.2 million to support an initiative between McGuire and Stevens so right now we are in the R&D phase, looking to follow that up with an actual construction project to construct this biomass plant.

Several other funded projects.

Just over the course of last month, we completed two solar roof projects and are looking to do several more. I talked about a waste oil burner. I talked about the daylight harvesting.

Another area that we are focusing quite a bit on is HVAC, our heating, ventilation and air conditioning systems, many of which are old and out of commission, spending a lot of time either repairing, replacing or recommissioning. This has huge pay backs and also really makes for a much better working condition for our troops.

Smart meters.

You know, as I mentioned earlier, it's very essential that with these initiatives that we capture the true results and the true savings so that we are applying smart meters to all of our larger facilities.

A couple of unfunded projects.

Geothermal. We are still in the design phase, however, we're not sure that geothermal is going to make sense. It's a retrofit. Instead what we're looking to do is incorporate geothermal into our new construction. What we found was a return on investment for geothermals to retrofit an older facility, roughly 25 to 30 years. If you incorporate it in as part of new construction, it's more along the lines of about seven to eight years so it absolutely makes sense as part of new construction. We're not convinced at this point that it makes sense to do as part of a retrofit.

The other things that we're looking at, we're looking at the possibility of wind. We're not sure how much sense it actually makes at McGuire, but one of the initiatives out there is we are becoming a joint base with Lakehurst and Fort Dix. We've had a lot of discussions with Lakehurst because the higher sustainable winds out at Lakehurst may make a lot of sense out there.

Another thing we're considering is a small nuclear plant, not to say that it's going to happen, but this kind of falls within the range of we're looking at everything little, everything big and everything in between. Things as simple as replacement of our light bulbs with compact fluorescents. We just replaced 12,000 of those a couple of months ago with compact fluorescents, but we are also looking at some large scale. And to become energy sustainable, basically everything is on the table.

Some conclusions.

Our strategic energy plan is a work in progress. You know, if it was easy to become energy sustainable, we would have done it ten years ago. This is going to be a challenge, but this is why we established it as, basically, a five-year goal. We're going to continue to refine our strategic energy plan until we get there.

The problem is bigger than one person, one aircraft, one base, one command, one Air Force. I go back to one of the initial themes is that it absolutely has got to be a team effort. It has got to include industry and universities and institutions like the Clean Air Council. There is a tremendous amount of brain trust at that table and experience.

The last thing we want to do is invest dollars in some sort of what we feel is the solution, something that somebody else has tried and already found that it does not deliver what it was promised so we certainly are going to rely on folks such as you at the table to help us in this quest.

192

Also, as I touched upon a little bit earlier, we absolutely need to put a solid effort forward when we're given the opportunity to construct new. Currently, we're undergoing $220 million worth of new construction as we close Willow Grove and bring that mission to McGuire, pushing sustainability is part of that. Once again, silver at a minimum and hopefully we can get up to the gold standard of LEED for at least one of those facilities.

The last thing I'll leave you with is that we -- you know, part of our drive here is not only to do the right thing, but also to establish energy security for McGuire. You know, we have seen the power of blackouts hit New York City. Boy, I tell you, the impacts on emissions of places like McGuire base and Lakehurst when things like that happen are just absolutely tremendous. So it's -- for us, an added benefit of becoming energy sustainable is having the ability to keep the mission going, not to have to rely nearly as much on the grid and basically to ensure our security by becoming energy sustainable.

193

In conclusion, McGuire is leading the way on resource preservation. Clearly, a good history of accomplishment in the environmental arena and now we're looking to stretch that to energy.

Transitioning from planning to action, we spent the last year or so putting a lot of concepts out there, programming a lot of projects. We anticipate an awful lot of money whether it be economic stimulus or Air Force Smart Ops, the AFSO 21 dollars in the next year.

We believe energy conservation begins at home. We are looking to set the example and partner and also hopefully benchmark some ideas which can be used in the surrounding community.

With that, I will take some questions.

Sir.

MR. SPATOLA: You said that you have a 50 percent energy reduction plan in place?

MR. ARCHER: Yes, sir.

MR. SPATOLA: Who put that plan together for you and how did you get the resources to put that plan together?

MR. ARCHER: The bulk of that was the Energy Savings Performance Contract, several ESPC energy contractors out there, but basically it was Amoresco (ph) is our ESPC contractor. There are numerous companies like that that are out there, but ours was through the Department of Energy and, also, through some Air Force contracting vehicles; but if an institution or a company was interested in doing what we were doing, I would recommend they contact the Department of Energy.

The concept is very simple. Basically, a lot of large organizations, unfortunately, don't have the resources at hand to make this happen, so instead they finance it.

Now, the ESPC companies are well versed in this. They come in, they assess. It was several months of working with our energy managers to determine what was feasible at McGuire. They quickly honed it down to these four initiatives, lighting has a great pay back, the EMCS systems has a great pay

195

back, our chill water plant had an outstanding pay back. The decentralization of the central heat plant, a little bit less on the pay back side, however, a tremendous amount of reduction in consumption. So when you balance those four basically over the course of 20 years, this ended up paying for itself.

Ma'am.

MS. MOUNT: This is very admirable.

Do you see this happening across the board with other branches of the military, the Army, Navy?

MR. ARCHER: It will. I take a little bit -- I guess a little bit of pride, you know, being in the Air Force that, you know, the Secretary of the Air Force really stepped out and took a leadership, but this is across DOD.

There was an executive order that was put out about two years ago that had really kind of stimulated this. Basically, they had many of the same goals that the Air Force had as far as reducing consumption and pushing renewables. Basically, it was put

196

out across for all federal activities.

Now, how each federal activity embraces the challenge and really puts their resources behind it, it varies from, you know, from the Air Force to the Army to the Navy, but, you know, we've got an interesting opportunity here with McGuire being a joint base with Fort Dix and Lakehurst that we can clearly apply what we're doing to Fort Dix and Lakehurst. And, you know, the hope there is when the other Army and Navy bases see the pay backs that Fort Dix and Lakehurst are going to see, it will be applied. A lot of it just really just makes sense. It's just absolutely -- it's win/win whether you're focused on reducing long-term costs, whether you're focusing on just providing better cleaner facilities for your people.

This is one thing that is a little bit unique about the Air Force is that the military folks that I work with at McGuire not only work there, but they live there. My boss at the end of the day basically, you know, shuts off the computer and then has a three-minute commute across base to his house

so it's just -- you know, it's just an added incentive.

When I go back to what we did with reducing hazardous materials and hazardous waste, the benefit is there for the worker, for the person who is working in the corrosion shop, who instead of using what we used to use 15, 20 years ago, which was very hazardous substances, which were bad for a lot of reasons, you know, we very aggressively reached out and pushed the envelope and replaced those with green substitutes.

VICE CHAIR HANNA: Thank you very much, again, Chris.

(Christopher Archer was excused.)

VICE CHAIR HANNA: We're going to continue on this theme of fostering off-grid solutions and Johnson & Johnson much like -- in a different way than maybe McGuire base is its own microcosm of energy management needs and Dennis Canavan is the Senior Director of Global Energy for Johnson & Johnson, he's going to speak to us today. His responsibilities are developing sustainable energy strategy for Johnson & Johnson

facilities worldwide, implementing projects and programs to improve energy efficiency and assure supply, promoting the use of renewable energy sources and reducing greenhouse gases for J&J facilities.

Thank you for very much for joining us, Dennis.

MR. CANAVAN: Thank you. I appreciate the opportunity to tell you a little bit about what J&J is doing in energy. It's a little tough to follow the Air Force, but I think what I will talk about reinforces a lot of what Chris was talking about.

Just a thumbnail sketch of J&J, we were founded in New Jersey, New Brunswick, New Jersey, which is still our headquarters in 1886. We are a very decentralized company. We have about 250 operating separate companies around the world. We have about 120,000 employees, almost 15,000 employees and retirees in the State of New Jersey and we operate in 57 countries.

We have three parts of our business, a consumer business with products you may be familiar with like baby shampoo and

Tylenol and Neutrogena and we also have a pharmaceutical business and a medical devices business.

We're a healthcare company and the one thing we do understand is that climate change will have a devastating effect on human health. So back in 1999, we put in place a policy to reduce our greenhouse gas emissions. And in 2003, it became an official policy of the company, mandatory for all of our sites around the world.

We did set a goal to reduce our absolute emissions for all of those facilities by 7 percent compared to our 1990 emissions by 2010, by next year. 7 percent doesn't sound like a big number, but it's an absolute goal. Between 1990 and last year, our company in terms of sales has grown more than almost sixfold so while we grow, we have to continue to reduce our absolute emissions. We are tracking very well to meet and actually exceed that goal next year.

When we first started out on this quest in 1999, I mean, we really didn't know exactly how we were going to go about doing it so we had kind of a broad strategy. One thing we did know for sure is that energy efficiency had to be the most important component of what we do. We also ventured into on-site cogeneration and on-site renewables and also purchasing green energy and doing carbon trading and sequestration where it made sense.

I want to talk a little bit about the first three categories.

One of the things we found to kind of be holding us back on doing some of the larger projects is just making sure that we appropriate the funds to do these projects. So in 2004, we actually worked out a plan to put a certain amount of money, about $40 million aside each year to fund projects that reduce our CO2 and also meet a certain financial hurdle rate. And we set that hurdle rate at 10 to 15 percent. Anything that meets the 15 percent internal rate of return after taxes is a project that would produce that funding. If it hit 10 percent, we kind of looked at the other advantages of the project and made a decision.

The key point is that a project

had to show that it was really reducing our CO_2 emissions.

Since that time, we have done about 63 projects under this program. And again, these are larger projects usually about a half a million dollars or more. The smaller projects are always kind of getting done as we go.

We invested about $128 million during that time on these larger projects and had a pretty significant reduction in CO_2 emissions, about 10 percent of our worldwide emission as a result of these projects.

The thing I really want to focus on is the return. I mean, we are getting over 17 percent internal rate of return on these projects. So while we're doing something good for climate change, it also just makes good business sense to do these kinds of projects.

Companies that are looking at climate change legislation and kind of fear the cost of doing this, I would tell them, based on our experience, you know, there are lots of opportunities to reduce emissions and do it at a profit.

202

The little pie chart there shows the type of projects that we've done. I'm going to show you some of the pictures of some of the projects, but a lot of the attention is around solar and cogeneration, wind projects that we've done, but the majority of the work we do is really in efficiency and that's where the best returns on investment are.

To emphasize this, we started doing energy efficiency best practices in the early 1990s. We actually set a goal that every one of our sites worldwide would be 100 percent in compliance with energy efficiency recommendations by 2005.

In 2005, we hit about 97 percent. We don't do solar projects until a site does all the easy things, does all the things to make them as efficient as they can be. We have a list of ten categories. Every site goes through that list and is required to implement projects that can reduce our emissions.

A few projects I would like to hit on. You've heard a little bit about geothermal today. The first few slides I'm

going to show are some technologies that really aren't that common in New Jersey, but they are common in other sites of ours around the world.

In Europe, geothermal is a very standard technology. A couple of examples, we built a plant in France two years ago and instead of putting in the traditional boilers and chillers, we put in a heat pump that runs on groundwater and it actually is much more efficient than the standard technology.

The other example is in Ireland where we use groundwater for cooling purposes; and again, it has an excellent pay back.

Biomass projects, this is another example where we kind of look to Europe to be the leaders. In Schaffhausen, Switzerland, we shut down a gas-fired boiler and put in a wood-chip burning boiler.

Just last year, we started up a biotech technology facility in Cork, Ireland and this is probably the most sophisticated facility we have in the world, technologically, and it's being powered by wood chips from the sustainable forest.

204

Also, on the right is a project that we did out in that state on the west coast at our ALZA facility. We happened to be right next to a municipal waste dump and we tapped into the methane from that facility. We piped it to our facility. We're running 3 megawatts of electricity and we're also capturing the heat from that.

Solar thermal, this is an example

of capturing the energy from the sun to heat water. This is a project we did in Shanghai probably about ten years ago almost. Here is another example in Pennsylvania.

Let me shift now to some projects in New Jersey. Cogeneration is one that I think has been very successful. These are two projects that were done in Raritan, New Jersey. On one side of the road at Ortho Clinical Diagnostics, we put in a 1.6 megawatt gas turbine that provides about half the power for that site. We also recover the heat from that. And we're just starting up another one across the street in our pharmaceuticals facility, 3.5 megawatts also a cogeneration system.

The reason this makes so much sense is that when we get power from the grid, it's probably about 35 percent efficient by the time it gets to our meter. By putting these kinds of projects in, we recover the waste heat. These projects are more like 70 to 75 percent emissions. They're particularly effective now when gas prices are down and electricity prices are still pretty high.

Two solar projects were done in New Jersey. Again, these are the ones that get a lot of attention, but kind of the last thing we look at, at the site.

This is the one we did back in 2002 in Warren, New Jersey, a smaller facility.

This is the facility in Titusville, New Jersey, also, a LEED certified, about a half a megawatt of solar power on the roof.

This is the J&J consumer headquarters in Skillman, New Jersey. This is our first ground-mounted system. It covers about three acres. It generates about a half a megawatt of power. It's also a tracking

system, which is pretty cool. It tracks the sun as it goes across the sky.

Ethicon in Somerville, New Jersey about 250 kilowatts, an older facility where we just put the panels wherever there was room on the roof.

This is our headquarters in New Brunswick, New Jersey. This is another tracking system that we put on top of the parking garage.

Raritan, New Jersey, again, about half a megawatt, you can't see much of it, but again panels everywhere there is space on the roof.

And a project that we're starting

up right now, this month. We actually own the highest hotel, which is across the street from our headquarters and we're installing solar panels on that roof, as well.

We have three other projects that are in the development phase right now. And when they're complete, we're hoping to double the amount of solar power we have in the State.

I'll throw in one more from our

site out on the west coast again. This is a pharmaceutical manufacturing plant in Vacaville. This is our largest solar installation. It's 1.2 megawatts, also, a ground-mounted system and when the sun is shining, it provides about 30 percent of the power that we need for the site.

I am going to reinforce something Chris also said about doing things right from the beginning. We also are building all of our new construction to LEED standards now. It has become a policy of our company.

Just to give a little bit of a look at some of the advantages of doing this. We looked at a number of studies and some of our own experience and in order to get LEED certification, we estimate that there is some incremental cost, but it is relatively small depending on what level of certification you're looking for, but the amount of energy savings it provides is very, very significant and more than pays for any upfront incremental cost.

One example of that is we are under construction right now for a research

facility in Springhouse, Pennsylvania. We got approval for all the points for gold certification and it did cost us probably a couple of percent more, but if you look at the bottom there, it's going to be 45 percent more efficient energy wise than the standard ASHRAE designed building.

Okay.

This is a kind of a pie chart, but I just thought this might be worth taking a look at. The McKinsey Company put a report out called, Reducing U.S. Greenhouse Gas Emissions, How Much At What Cost. And this is an abatement chart. This is predicting by 2030 what kinds of projects we would need to do nationwide in order to meet the standards for the reductions put out in the IPCC report.

So on the Y axis, this is the cost per ton of reduction and they rate all the different technologies from the least expensive to the most expensive. And we really need to pay attention to this.

Over here, the least expensive things, you'll see things like appliance standards and residential lighting. Combined

heat and power is on that side. And what that means is it is below the curve. It's actually reducing CO2 emissions and still providing financial returns. So it's costing less overall than the investment or it's providing returns on that investment.

When you start going above the curve, those are the technologies that are not going to pay for themselves. Solar is out there. You know, without some incentives, solar would not provide a pay back.

When I was preparing for this, I took the opportunity to look at some of the websites for the master plan of New Jersey, New Jersey's Energy Master Plan. And I was really impressed. I hadn't been keeping up with everything that has been happening, but the body of work that is represented and what has been happening here in the State is truly showing great leadership.

We work very closely with the Clean Energy Program, the BPU. They've been great partners with us. The renewable energy standard, the Warming Response Act, RGGI, all of these things are exactly what the State

needs to do.

I thought I would be here being able to give you some good advice, but I think you have the plan right there, it is just a matter of executing it, but I do have a few comments.

As with any plan, I mean, execution now is going to be the key. And I would just think that based on our experience, where the effort should be put initially is certainly in efficiency, in standards for things like, you know, making sure that consumers make the right decisions about things like CFLs and buying energy efficient appliances and certainly building codes, which can give people a push to do things right from the beginning.

I think, also, in order to keep some of these renewable energy technologies going, they do need some support.

Cogeneration and biomass is very close to paying for itself without incentives, but I think there still needs to be some financial incentive to keep that going.

Solar, of course, is going to rely

very heavily on the ASTERISK (ph) programs for
some time.
Looking to industry, I think you should expect industry to operate as efficiently as they can and to do things like distributed generation where it makes sense. We heard from PSE&G and I think they're on target, as well. What we should expect from utilities is to deliver that low-carbon power. There are certain projects like wind and even CHP that's difficult to do on a small scale and it has a much better return if it's done on a much grander scale.
The other thing that didn't come up is that the model for utilities right now is -- they make money by selling more power. They are incentivized to sell more power. I think we have to turn that model upside down and we have to find ways for utilities to reduce the amount of power that they sell by making companies and residents more energy efficient and be able to make a profit by selling less.
The last point there is, you know, if the State's plan is to have a climate

212

change program and then kind of ignore it and everything else that they do and kind of continue on with business as usual, we're not going to solve this problem so I think it's important for the State for everything that they do is to consider the impact that those decisions have on climate change and on total emissions and find alternatives to do things smarter.

This is the last slide and I think this might be the most difficult. We really strongly feel what we need more than anything is national climate change legislation. I think it's going to be very helpful if the states, State of New Jersey and other states allow programs like RGGI to become part of a national program.

From the company's perspective, we operate all over the country and I think the only way for a cap and trade system to really work is to cover the entire economy. It's the only way that really targets that timetables are going to work to address climate change so I would recommend that you support a national climate change legislation.

213

We, J&J belong to a group called USCAP, US Climate Action Partnership. It's a group of 25 companies and five environmental NGOs in Washington. We're lobbying,

advocating for strong climate change
legislation in the United States.
This point was made before that we're not trying to -- we shouldn't try to pick winners and losers here. I think if we have a cap and trade system that's nationwide and we put a price on carbon that people, companies will innovate, they'll invest in the right technologies and they'll meet the targets for CO2 reductions at the lowest cost and I think that should be the main objective at the end of the game.
So that's it. I'll take any questions.
VICE CHAIR HANNA: Thanks very much, Dennis.
Irwin.
MR. ZONIS: Mr. Canavan, a question about the solar cells.
In each case, I think the solar cells produce less than 100 percent of the

214

power requirements of the facility where they were installed.
Does that require any mechanical action on the part of some staff member throwing a switch or do you just turn it on, on January 5th and let it run until there is some maintenance, until you have to shovel the

snow off it or whatever the case may be?

MR. CANAVAN: Solar technology is the simplest easiest technology that you could imagine.

When we put our first solar installation out in Los Angeles in 2000, we used to clean the panels and, you know. After having some experience, it turned out that you don't really need to do anything. You just ignore it. The rain cleans them off. Unless you have a tracking system, there is no moving parts and they just work. Even the tracking systems, you know, there is one little half horse power motor that moves the whole array and it couldn't be any simpler than that.

MR. ZONIS: Associated with that, there obviously are times when solar heat from the sun or the radiation from the sun is at a

215

minimum and you draw on a conventional power source.

Does the power company charge you in a twofold way; one, is for the demand, which means when there is no solar power; and the other, is for the kilowatt hours, which, of course, is reduced when you are receiving solar power?

MR. CANAVAN: First of all, we use all the power that we generate. And you're right, I mean, even the largest installation we have is only providing maybe about a third of the power so we never export any of the power from our solar.

Now, there is net metering in New Jersey and if we were to do that, you know, the utility would be required to buy it back.

But to your point about demand, just inherently, I mean, we're generating electricity from our solar panels at the time in the summer when we have the greatest cooling loads so we do reduce our demand and we do get direct benefit from that by not hitting those peaks on those hot days.

216

MR. ZONIS: Good; thank you.

MR. ELSTON: You mentioned your advocacy for a nationwide cap and trade program and you also used the words economy wide, which I assume means more than just your facilities.

MR. CANAVAN: Absolutely.

MR. ELSTON: What would be the extension or the limits you might place on that, say, industrial, commercial, utilities, transportation; or, how far should that go in your mind so that it is a good program, but, yet it's not to a point that it becomes such a

cumbersome thing that it gets fraught with all
kinds of problems?
MR. CANAVAN: Yeah. The USCAP group recently came out with something called, A Blueprint For Legislative Action and did lay out all the components we think should be included in a cap and trade system.
Our recommendation covers about 80, about 80 -- I think it is 84, 85 percent of the emissions in the total economy. It doesn't include transportation fuels. It doesn't, obviously, include all the big

emitters, like generators and industry. And through the LDCs, Local Distribution Groups, it does cover residential, but the utility takes responsibility for that. We're not expecting residents to track their use, but the utility has to account for it and that has to be part of the cap.
The point is to set a cap, to reduce it every year until we get to our 80 percent reduction in 2050. And they have to take responsibility for that. So through energy efficiency programs and other things they can do, you know, they need to meet that cap or pay a penalty.
MR. ELSTON: Per capita type of cap from a utilities perspective.

MR. CANAVAN: Well, the cap, it will probably be something like looking at traditional emissions from that utility and that becomes the base and then every year those number of tons that are emitted have to be reduced each year until we hit our target, but it is a very broad range of the economy.

VICE CHAIR HANNA: I am trying to accommodate all the council members here.

218

Mr. Maxwell, Mr. Egenton.

MR. MAXWELL: You mentioned that the solar panels, solar photovoltaic panels are not really affordable, unless there were subsidies.

MR. CANAVAN: Yes.

MR. MAXWELL: The next part of the question is: How long do they last?

I have heard anecdotally that they last maybe 12 to 15 years.

MR. CANAVAN: Every installation we have done, we have at least a 20-year warranty on the panels from the manufacturer. Now, they do degrade about a percent each year so that is taken into account, but if we have a panel fail, the company comes back and replaces it. It does happen occasionally or there is a manufacturing defect or something and the panel will fail, but 20 years is what

they warranty them for and we're expecting to
get at least 25 years out of them. We have
some that are ten years old now and we don't
see any degradation beyond what was expected.
MR. MAXWELL: Thank you.
MR. EGENTON: Dennis, considering

that we're the pharmaceutical chest here in
New Jersey and everything, it's certainly fair
to state that we're really proud through my
organization, the State Chamber of Commerce of
the work that J&J does in being an industry
leader in your prospective industry, seeing,
you know, that you're bringing that to a
facility like the Hyatt and such and what
you've done in New Brunswick.
Do you know if the other
pharmaceutical companies sort of look at J&J
as sort of the progressive leader in trying to
do the lead by example sort of...
MR. CANAVAN: I think we're one of
many that are out there. I mean, we work
closely with Pfizer. And Merck has just put
in a huge solar installation in Whitehouse,
Nova Nordisk. There are a number of companies
that are in our industry that are doing the
same kind of voluntary work. There are a few
that probably could pick up the pace.
MR. EGENTON: Understood, but

again, setting an example, just a plug for
your company, but the contribution of what
you've done along with Rutgers in turning

around New Brunswick is certainly commendable.
VICE CHAIR HANNA: One more, Jim.
DR. BLANDO: I notice some of the examples you gave were, you know, California and the northeast.
Is that primarily because the electric utility rates are highest in those areas of the country; or, how does that factor in?
I presume it does.
MR. CANAVAN: Yeah. I mean, we screen all of our sites and we pick the sites and the projects that give us the best returns because whether we save a ton of CO_2 in New Jersey or Pennsylvania or, you know, Malaysia, it has the same benefit to the environment. So we do make those decisions based on the best returns.
We certainly look at energy costs. And certainly on the west coast and on the east coast is where electricity prices are the highest. We have facilities in Georgia where electricity costs 4.5 cents a kilowatt hour and it's hard to justify projects there so we definitely do take that into account. It is

221

also where our sites are. We have a lot of facilities in New Jersey, Pennsylvania and California.

New Jersey and California clearly are the leaders in providing incentives and programs that support these kinds of projects so all of those things come into play as to where we actually do the projects.

VICE CHAIR HANNA: Thanks very much, Dennis.

MR. CANAVAN: Thank you.

(Dennis Canavan was excused.)

VICE CHAIR HANNA: We're going to switch now to Joe Dominguez from Exelon Generation.

Joe is the senior vice president for government affairs and general counsel for Exelon. Exelon is a company I'm sure many people know. It owns and operates 17 nuclear power plans around the country making it the largest private owner of nuclear plants in the world; also, larger generation, not just nuclear, but 32,000 megawatts of installed capacity in seven states and we'll hear some more from the utility providers' perspective.

222

Thanks, Joe.

MR. DOMINGUEZ: Thank you, Toby, and thank all of you for the invitation to attend today. I look forward to hearing your questions after my comments.

It's clear that you have already gotten a load of information today and I think I am going to thin down my presentation accordingly so that I don't duplicate what others have already covered. I think, unfortunately, Dennis stole a good bit of my thunder, but I think I'll explore a little bit the McKinsey curve that he mentioned at the tail end of his presentation and I'll blow that out a little bit to explain how, at least, Exelon Generation is applying that analysis to our decisions going forward.

As it so happens, I recently was at a conference where your colleagues from across the country were considering the very same issues that you're considering here today.

At the outset of the conference, the person who put it together said I would like you to spend a minute, each speaker come

223

up and say if you were king or queen for the day exactly what you would do. And there was great enthusiasm for that proposal in the early going. And I think by the end of the second day, we realized that we didn't really want to be the king or queen of this issue. I think we realized, and it has become cliche to say it, that there is no silver bullet and that the basket of solutions is going to have to be the foy here.

Going back to a point that Dennis made, I think the two central themes of the work that we did in that conference were allow for innovation and to send out appropriate market signals.

The review of the different technologies that we will talk about in a moment are just our review as of today and it's changing very quickly and, in particular, in the area of solar where I know New Jersey has been a historic leader.

The costs are coming down. They're projected to come down significantly. And as we look at what makes sense, front to back, from a cost perspective, I think that

picture is going to change year after year and we need to have the flexibility to allow people to make those decisions as the technology evolves.

I will, of course, talk a little bit about nuclear, our favorite subject and I will tell you about our experience in trying to build a new nuclear power plant.

Let me talk a little bit about Exelon. We own two utilities, Commonwealth Edison in Illinois and PECO Energy in Philadelphia.

We are, by a number of different vendors, the largest generation company in the country, most principally by market capitalization. We're a nuclear company predominantly. We own 17 nuclear reactors, but we also own and operate wind farms. We have the largest solar array east of the Mississippi. We have the largest landfill gas application east of the Mississippi, as well.

We are one of the earlier filers to begin operations of a new nuclear construction project in Victoria, Texas. I will talk a little bit about that when I get

225

to the McKinsey slide.

Bill Levis talked a little bit about this next picture and some of the cost estimates. The Brattle Group estimates that the cost of doing all the things that we plan to do in terms of reinventing the grid, adding the necessary generation by 2030 and also dealing with climate is going to cost conservatively about $1.7 trillion.

As I stand here today, the combined market capitalization of all the companies that do the work that our company does, all the utilities is about $300 billion, so we're talking about building between now and 2030 something that is five times as big as what we already are.

The investments are just enormous. To put that in perspective, the $300 billion we're talking about represents the streets value of all the assets that have ever been built and are still operating in electric rate base and in merchant markets.

The cost of doing it is sky-rocketing; that 130 percent increase in construction costs figure that is in the first

bullet is really just the beginning of what we've seen. We haven't seen the full 2008 data, but we expect for many different kinds of technology, the cost has doubled. Bill Levis talked a little bit about that.

The reality is all the components that we use to build power plants, whether it is cement or copper products have increased exponentially since the beginning of this decade. And although those prices have receded, as global demand has receded for those things, what we've seen is the finance charges necessary to build the project have overtaken the cost decreases.

In other words, it's cheaper to build a power plant today maybe than it was in 2008, but it's a lot more expensive to finance it. And as you know, in particular, for a nuclear power plant, the amount of time, the construction time really adds to the overall budget and sometimes doubles it just in finance costs.

We have a very ambitious goal within our own company to reduce greenhouse gas emissions. We are the lowest-emissions

source for any large generation company in the country largely because of our fleet of nuclear power plants.

We have a goal by 2020 to eliminate our carbon footprint completely. Now, we have coal assets and we have natural gas assets. When I say eliminate, I don't mean simply to shut down those assets, but that we build cleaner technologies to offset and displace the carbon that's already in the dispatch curve.

So, for example, building new nuclear, upgrading or increasing the output of existing nuclear power plants will be part of our plan to offset more carbon intensive

generation at the back end of the dispatch
curve.
We have LEED certification,
platinum LEED certification for our office
building in Chicago. It is the largest LEED
certified, platinum LEED certified commercial
office space in the world.
We have implemented very
aggressive efficiency standards driven by
legislation in Illinois and Pennsylvania, very

228

much like PS has done here in New Jersey.
And this will flow out the -- this
is what I really want to spend a little bit
more time on, I think it is a little bit more
readable of a version of the McKinsey work
that was done nationally. Again, it sets side
by side, as Dennis explained, left to right,
all the different solutions for reducing
carbon emissions. The x axis describes how
many metric tons of CO_2 in the millions could
be eliminated by employing some of the
policies or some of the technologies that are
described in this chart.
As you can see, and there is a
photograph, I gave you a booklet that goes
over Exelon's 2020 program, if you turn to
page 7 of that, you'll see the same thing, but
essentially, as you work left to right, as

Dennis explained, energy efficiency is below the line.

So we're already seeing that energy efficiency is something that should have been done. I mean, we didn't really need a carbon issue to do that. It is just something that was left on the table and

wasn't thought about as aggressively as we're thinking about it today.

The next cheapest way to get a large amount of carbon out of the generation dispatch curve is through nuclear upgrades. What we're talking about is not building new nuclear power plants, but actually increasing the output, as you know, of nuclear power plants.

There, again, some of the upgrades are already economic and the industry in large measure has implemented those upgrades so there is not a lot of oink left in this pig. Those things have been done.

Landfill gas presents an opportunity, but it's a sliver.

Other energy efficiency standards from lighting to building and transportation, energy platforms work, then we see natural gas. The green bar is just above the curve. Natural gas power plants being the next cheapest way to reduce carbon emissions.

Some of the work that is coming out of Europe is very interesting in this regard. There is a general view that natural

gas is cleaner than coal and, of course, it is from a pure emissions standpoint at the power plant, but the carbon policies in Europe track natural gas from really exportation from the well all the way to the plant. And what we find is that a number of the natural gas wells have embedded CO2 in them and you have a lot of bleed-off CO2.

What's happening right now is that is just bled off into the atmosphere and nobody cares. It's a harmless gas for the application. But when you include that CO2 that gets bled off at the well, some wells produce an overall carbon impact that's even greater than coal.

So it's a very well-specific and technology-specific determination of whether natural gas works or not and how that gets taxed or how the cap and trade policy works with regard to that bleed-off gas is going to be incredibly important as you select the technology, whether natural gas should sit right here.

The next light blue bars are

nuclear upgrades that are presently not

economic.

Now, when we did this chart, we did it in the summer of last year when prices were at their highest, right; now prices for electricity are substantially down, which means that that horizontal bar has moved down and all of the things that are above the bar are even further above the bar today in terms of their economic viability.

We then get to new nuclear and I'll talk now about the Victoria project. We have been working on that project for about three years now. It has been very difficult to get firm-cost commitments for a new nuclear power plant in the U.S. What we are looking at is an investment in 2012 of about $16 billion.

Now, last summer, just bringing you back and giving you a kind of a relative context because every story has a context, last summer our company's market capitalization was about $62 billion and a $16 billion investment was enormous, but could be something that could be contemplated.

Today, our market capitalization

is $30 billion. It is not just us, but it has happened across the industry. We were the biggest back then. We're the biggest now. People have proportionately moved down.

So as, as Bill mentioned for PS, investing $16 billion when the total value of your other 17 nuclear power plants in the market is $30 billion is a difficult proposition. It's a dual unit, so we'll end up with 19 units, but we're going to spend half of what 17 are worth right now.

As I talk to others in the industry, it's very clear that getting confirmed figures for nuclear, whether you're going back to Westinghouse, the Japanese consortiums, the French, General Electric are very difficult right now.

Where we're seeing the best technology deployment is in the Far East, both Japan and Korea are building new nuclear units on a 39-month cycle. We have never seen that in this country.

The French EDF is building a new plant in Finland -- I don't know if you've followed this -- that plant is three years

behind schedule and already 170 percent of budget.

So we have a very interesting scenario here and it is hard to figure out whether we have an aberration in Finland and EDF would say we do. EDF would say, We're going to make all our mistakes in Finland -- it's a good PR story, right? -- but we'll get better. And the Japanese and Koreans are deploying existing technology that is a little bit less sophisticated than the French technology, but are deploying it on time, on schedule, 39 months.

I don't know that we will ever get to a regulatory framework that will allow us to get start to finish at 39 months in this country, possibly at brown field sites, I'm being very candid here, where there are already existing nuclear units and the community is comfortable with the presence of those units.

There has been somewhat of a renaissance in terms of the public reception to nuclear, but we haven't started building yet. We are really going to have to see what

these early units bring.

As you can see, if the cost numbers that we were getting are accurate, the unit is out of the money, big time out of the money.

So what we're going to need in this marketplace is a signal, a price signal that allows us to build the unit. What you're seeing there is a price signal of about $40 million. Now, that's a gross price signal for carbon per ton that would have to be implemented in order to make the plant economic.

The reality is the federal loan guarantees, if they're fully funded, absorb the bulk of that 40 million. If we were to put a line through this for the federal loan guarantee program, we'd probably see a line down here and this blue would shrink and it would move over dramatically to the left on the displacement curve.

To give you an indication, if you can see it, this is wind, the green bars and the line below represents wind with all the federal subsidiaries in it so the federal

235

subsidiaries are enormously important and, if they are continued, wind moves dramatically over to the left.

All the way over to the right of the curve, that big orange block is carbon sequestration. We have not seen a real project that has developed and implemented that technology.

Dr. Herzog (ph) at MIT does not believe the cost structure for carbon sequestration is going to dramatically improve because, according to him, it would require rewriting of the laws of thermodynamics so it is likely that carbon sequestration is going to stay way out to the right?

Does that mean it's not going to work well?

We've got 48 percent of the nation's electricity being generated by coal. We still have natural gas-fired plants coming on, which may be cleaner, but they're still going to emit greenhouse gases.

I saw when I was talking to a few of you, you said, Oh, carbon sequestration, I've heard that story before. We have, too.

236

And we're investing in some of the research on it and it's a long way off, but I say to you that unless we start thinking hard about either deploying a lot more nuclear power plants and I'm talking about 300 in the United States and that's probably not going to happen, right, we've got to figure out some way to deal with the existing carbon that is coming out of these plants.

It's a simple matter and you've

all heard the stories about India and China bringing on a lot of coal plants. So we've got to figure that one out and no one wants to be king or queen for a day on that decision.

Solar is way out to the right.

Now, if you sat in our board room yesterday when we had a discussion about this, where we see the promise, the greatest promise in terms of moving the technology to the left on this curve is with regard to solar.

What you're seeing there is an implied value of about $6500 to $7500 of KW in 2012 dollars; that's why it sits way out there.

There is thought that within a

237

decade, that could be cut in half. The DOE Secretary Chu has recently said that he would need a fivefold improvement in solar for it to become economic.

Let's talk a little bit about solar because it's very interesting and I heard a great question. We have a 3 megawatt array and one of the great things we see is that it's coincident with load.

In other words, on the hottest days of the year -- we have five wind farms. On the hottest day of last summer, we were getting 6 percent capacity factors out of our five wind farms. In other words, in that 24-hour period, they operated about an hour. It wasn't the hour we needed them from a utility perspective. It wasn't from 12:00 to 6:00 in the afternoon.

Solar is a different story. It's more coincident. And in addition, if it's distributed solar at the rooftop level, it eliminates some of your expanded T&D costs for the utility.

The real question and I think, Mr. Elston, I think you asked this question

238

before is how do you deal with net metering in a solar environment. It's a very tricky societal issue because as you have homes, principally homes probably owned by bigger wage earners in society that go to solar first and there is net metering, there is a potential where their utility bill goes backwards, they're getting a payment from the utility every month.

Well, as that expands throughout the system, what happens is the utility is not able to collect from its own customers for the T&D infrastructure buildout that's necessary to maintain the system and yet there are users of it because when the sun goes behind the cloud, they still draw electricity from that

system. It's a necessary backup.
So it's one of the tough societal issues that I think your colleagues in other states are dealing with and there is a concern as we go to a broader deployment of solar over the next ten years whether we're going to have an interesting impact on the utilities' returns, such that we have to really rethink of decoupling in almost a different way.

Does everybody follow me; does it make sense?
Let me go back to kind of where I started and I think where Dennis left off; what we really need to see here is a carbon policy. Everybody who has been here has told you that picking winners and losers today is almost invariably going to be wrong. And I think we would concur with that 100 percent and we've lost lots of money proving out that principal.
The fact of the matter is all of these technologies are improving rapidly, some more rapidly than others in the case of solar; some are going to be limited by the laws of science in the case of carbon sequestration; and some we've already seen such rapid improvements in that you wonder whether or not we're at the top of the curve. And I'm

talking about wind, how much more are we going
to get out of those windmill applications.
If we have an appropriate price signal in the market that is consistent, that doesn't require a legislature to completely renew tax credits on an annual basis or every

few years and it's baked in, like we're dealing with SOx and Nox right now, it's something that the market will respond to and will build the appropriate technologies, although you're not going to be able to go back and tell people exactly what they are today; so that concludes my remarks. I would love to hear your questions, if you have any.
VICE CHAIR HANNA: Thank you very much, Joe.
Michael.
MR. EGENTON: Yes.
Joe, obviously, we have heard how Europe is ahead of the curve and France is 80 percent powered by nuclear.
MR. DOMINGUEZ: That's right. I think it is slightly below 80, it's like 79 percent, but you're right, yeah.
MR. EGENTON: And then what is going on in Asia both on nuclear and coal fired.
I always like to benchmark how we

in New Jersey compare to other states. Now, I heard from a colleague at the Chamber down in North Carolina that they're considering as

many as six or seven nuclear power facilities.
Do you know anything about that?
I think two by General Electric.
Can you enlighten me on that?
MR. DOMINGUEZ: Yes, I can.
North Carolina along with Florida and Texas have the largest number of units on file. I think Florida has six; Texas has another six being filed. I would be surprised if more than a third of those get built within the next ten-year period. I mean, in terms of actually, you know, people putting bricks and cement in the ground right now.
It is clear that those states are very interested in advancing the ball. I can tell you from being down in Texas an awful lot and spending time down there, the whole feeling about nuclear is so dramatically different. There is a friendliness towards the technology that we simply don't see here in New Jersey. And it's partly because Texas is so big that nuclear power plants aren't on top of communities and we have to recognize that that's a legitimate issue; but frankly, they're just far more comfortable with the

242

technology there than we've seen in New Jersey
and there would have to be a substantial, I
think, push to change that sentiment.
Although, as we poll, as we do
polling, for example, for Oyster Creek, which
has been in the newspapers an awful lot
sometimes with not good news, residents seem
to still support it in fairly large numbers;
but if I did that same poll in Texas, the
numbers would, you know, blow you away. It's
overwhelming.
MR. THOMAN: The statement you
made about looking to go carbon free, I didn't
see a make up on the company with regards to
coal.
MR. DOMINGUEZ: Yes.
MR. THOMAN: How much coal do you
guys operate?
MR. DOMINGUEZ: We own a share in
Keystone Conoma (ph), but we don't operate
that unit. We own about 22 percent. We have
the Crombie (ph) facility and we have the ^
Eddystone (ph) facility in Pennsylvania and
that's presently all the coal that we own. We
sold our coal assets, the bulk of our coal

243

assets in the midwest about seven years ago.

So we have two coal plants that we operate that are -- I'm going to give you about 1600 megawatts in total and we have about 22 percent of another 800 megawatt unit.

MR. THOMAN: So when you say you're looking to go carbon free, does that mean that you're looking to get rid of your coal units or is it just technology bringing you to a level that it will be so small?

MR. DOMINGUEZ: It may require the closure of select units; that's probably as far as I could go here without giving away competitively sensitive information.

Beyond that, what it really means is we're going to build cleaner technology that we believe is going to displace dirtier technology at the end of the spectrum.

So, for example, if we built out all nuclear power plants, let's just make it very easy here --

MR. THOMAN: Right.

MR. DOMINGUEZ: -- what we would be effectively doing is displacing or having plans at the end of the dispatch curve that

244

will no longer run; all the coal would move over, all the natural gas, that wouldn't run, those units would effectively shut down.

We're taking credit for that displacement, which is intellectually honest and I think the most accepted way of doing this.

Look, until we figure out a way to take carbon and stick it into the ground, we are going to be talking about displacing or offsetting through other environmental devices; such as, reforestation and those sorts of things.

VICE CHAIR HANNA: I am sorry. We are going to have keep moving.

Joe, I appreciate your time and thank you.

MR. DOMINGUEZ: Toby, thank you.

(Joseph Dominguez was excused.)

VICE CHAIR HANNA: Next up, we have Jeff Halfinger from the Babcock & Wilcox Company. Jeff is project director for Babcock and Wilcox and has 25 years of experience in the development of advanced nuclear systems and components, including development of space-based nuclear power systems and Jeff is

245

currently working on the development of small modular reactors for distributed power applications.

Thanks, Jeff.

MR. HALFINGER: I think the last couple presentations are great lead-ins to this conversation.

You've been following what has been happening in the nuclear random house over the past five or ten years. Nuclear is baseload. It runs all the time. It is always available. It is nonemissions technology. The only thing it generates really is heat, but over the past couple of years what has been happening is, as we've heard twice today, that the companies are going to have to bet the farm to get into nuclear or significantly enhance their nuclear capabilities.

So we've been looking at that and we've been working with Chris Archer a couple of times and talking with him about McGuire Air Force base particularly as a demonstration plant facility for something much smaller, something that is more amenable to distributed power so pretty much that's what we're going

246

to talk about today.

Does this work or do I just shine it in your eyes?

Okay.

You know, obviously, what we have been talking about is that there is a shifting landscape in the energy market.

Increasing construction costs, we heard about that.

The construction time is from 36 to 38 months to eight or nine years.

There's a lot of skilled labor in the craft. It takes a lot of money to train those people.

The NSSS component supply chain, there is one guy for large nuclear power plants. So there is one guy in the world who can make the large portions and that's in Japan so everybody who wants to get into the nuclear business has to go to Japan years ahead of time.

Tightening capital markets, I don't have to really elaborate on that, everybody knows what is going on in the market, but the loan guarantee program,

247

whether that's going to go through with the Department of Energy or not.

Capital costs over a long construction cycle adds a lot of cost to building and deploying nuclear power; but on the good side, I guess, from a nuclear perspective, the carbon-constrained regulatory framework, we don't know what that is going to look like. It looks like something is coming out in the near future so we need to figure out something that generates baseload power inexpensively without generating greenhouse gases.

So modular reactors, from my perspective, when we talk about nuclear power, you're talking about several large vessels within the facility. You have the reactor, which is a large steel vessel. The new plants either have three or four steam generators, a pressurizer, you come out through a steam turbine and spin a generator and then you put electricity out on the grid.

Nuclear power is just another way to heat water so whenever you're talking and thinking about the real high technology, it's

a tea kettle.

What do people think about nuclear power?

This is pretty much what you put in the back of your mind. This is what a nuclear power station looks like, right?

It is 1000 megawatts, 900 megawatts. For a new one, they're 11 to 1600. You have the conical cooling towers. You have the nuclear facility here usually sitting next to a large reservoir, river.

With modular reactors, you need to think differently. The paradigm is different in the modular system. In the olden days, with nuclear power and, quite frankly, even the Generation 3 reactors, that they are contemplating today, bigger is always better. You have to have as many megawatts as you can get into the vessel to amortize your high development costs, high construction costs over as many megawatts as you can put in there.

Modular reactors, you have to think differently. Our economies of scale is you're building lots of them. So when you

think about tooling up a factory where you can build the entire NSSS system, put it on a rail car and ship it to the site, you can build the tooling, you build the entire safety system actually under very controlled conditions.

So think about this and remember this isn't what we're talking about.

As we heard a couple of times today, there are lots of reasons in what I just said why you want to have a nuclear power plant give us as many megawatts as it can; its cost efficiency in the development, the design and licensing risks, the baseload impact, how far can you move the needle, how much impact can you have in a particular area. I would argue that there are not too many areas you can actually put 16 megawatts on your grid and use it right away.

On the other side, the NSSS supply plan, where you have to go to one plant just to be able to get all the forgings, let's say, you don't want to make them that large. The construction schedule for modular systems is much shorter than a field constructed system, and then project financing in association with

that shorter schedule. There is a lot of -- there is a lot of drivers in today's market that says the optimal size might not be more than 1000 megawatts.

So what we're looking at is basically the figure on the right is what we call the Nuclear Steam Supply System. It is one vessel.

Remember that first picture I showed you where you had the reactor vessel three or four steam generators, pressurizer; that's all contained within this one vessel and it's fabricated in the shop. It's what we call an integral reactor. It's shop fabricated. And you get the scalability by adding as many plants or modules that you need for a particular site or what you expect the growth to be so you can build them quicker, you can put as many modules as you need for a particular facility. It's rail shippable, which means you can put it anywhere you need to, you don't have to be on a navigable sea way to get it to where it needs to be.

Evolved PWR is very important when you go to the NRC. There is a PWR regulator.

There is a lot of other concepts out there with sodium and FASS (ph) reactors and things like that, but they're very confused about it, quite frankly, and it's going to take years in research and development in order for the NRC to become comfortable with that.

Passive safety becomes very important. The way you get your cost efficiency in a modular system is you don't put all the active engineer controls on it so basically when the plant has a trip, you have days to be able to respond to it, even with PWR technology.

Fewer moving components, the steam generator where you actually boil the water is inside the vessel. There's an internal pressurizer, which we can go into a three-hour nuclear engineering course if we want to.

VICE CHAIR HANNA: Not today, Jeff. Sorry.

MR. HALFINGER: Next time?

I'll come back.

Simplified operations of maintenance.

Basically, one of the things that

I think we had a problem with, with the 104 reactors that are operating in the country today is that you have almost 104 first of a kind. They are all just a little bit different. The utility wanted it this way or that way. And the nuclear suppliers of days gone by accommodated that. So what happens is you don't have anything that is very standard. The technology is generally standard, but within the framework and the guts of the systems, they're all different.

With a modular system, they have to be all the same. If the shop isn't fabricating exactly the same component everyday, it loses the benefit and advantage of the modular system.

So this is a cut-away view. I don't have to spend a lot of time on it, you're nuclear guys, but this is the cut away of a nuclear system. The nuclear fuel is down here. The hot water rises up to the center of reactor, turns around, comes to the steam generator, gets pulled through a couple pumps and just stays in that circle. The water comes in here, goes up through the steam generator and it comes out as steam to the steam turbine and turns the turbine and generates electricity.

This is the facility or the reactor in the containment. This is the old concept of the containment. We've updated it quite a bit, but the basic functionality is the same.

The idea is the reactor sits inside this concrete containment building. The spent fuel for the reactor, for the entire life of the reactor is stored inside the reactor building so you don't have to have it stored outside, stored in dry cat storage, you can take it out of the reactor, set it here and never have to touch it again. You can take it out if the government ever figures out what to do with it or what they want to do with it, you have the option to move it, but you don't have to.

The interesting thing about the small modularity concept is that the ground level is basically here, so everything here is underground so you don't see the large containment structures when you drive by and

254

you don't see the big cooling towers. The

concept is you have the air-cooled heat
exchanger, condenser rather than the large
conical cooling towers.
If you look down here, this is
basically what the facility would look like.
It almost looks like an airplane hanger or a
large warehouse. When you drive by it on the
highway, you wouldn't know it was a nuclear
power plant, except it has a lot of wires.
The reason for putting it
underground is there are some current
regulations in the NRC and rule making that's
going on with missile penetrations and
airplane impact. If you put it underground,
the airplane can't get to it. It has a lot of
advantages on missile penetration and seismic,
not having it sticking above ground.
This would be a four-module plant
so basically you have four containment
structures all independent of each other.
In this particular example, you go
to two turbines, so you have -- each one of
these are 125 megawatt so you have a 250
megawatt turbine. And you have redundancy, so

255

if you do sequential outings, when you refuel
today, you take 1000 megawatts off the grid.
In this particular concept, you would take
125 megawatts off the grid and you would still

be running three-quarters of your capacity while you're refueling one module.

And then if you put that in the whole entire plant, the size is about roughly 50 or 60 acres and that -- the large size of that is dictated by NRC regulations and those are out of the boundaries because these are only 125 megawatts, the nuclear inventory, the data product inventory is one-tenth of 1000 megawatt so you could bring in those boundaries because your dispersion in a severe accident, which you have to analyze for the NRC, would be roughly one-tenth of a regular plant.

Talking to Chris and McGuire Air Force base and Kirkland Air Force base and other government installations, we got to thinking about how this could be usable in a facility like that when they are really trying to get off the grid and be sustainable in their own installations.

256

So it's obviously a small, compact design. It's passively safe so you don't have to have a really large infrastructure to operate it. The refueling cycle would be five years for standard 5 percent enriched fuel. It could go up to ten years if you go to something like 10 percent enriched so that

means you turn it on and run it for five years
and then shut it down and refuel it.

It's built in the US. The heavy forgings can come from Lehigh Heavy. We designed it specifically to be able to meet their capacity. B&W has large manufacturing Endstamp (ph) facilities in Indiana, Arborton (ph), Ohio, There is a facility up in Canada. There's a fuel fabrication in Lynchburg, Virginia.

It's a modular construction technique so you build the facility, you build the containment structure, you ship in the reactor module and you basically just hook up.

The other things that are interesting when you get down another layer just besides electricity is there are other things you can do with small reactors if you

257

can put them where you need them to be. You can obviously generate steam because that's what the reactor does so instead of going to a turbine, you can actually just have a steam plant. You can use that steam for desalinization or you can use it for electrolysis for possibly hydrogen or oxygen production, possibly Fischer-Tropsch if you want to do a coal to liquids type of a technology.

If you use nuclear heat from Fischer-Tropsch, Fischer-Tropsch has a really bad name because it has a huge CO2 footprint. If you go to Saucel (ph) in South Africa, the CO2 emissions are just incredible because you burn coal as a heat source to make diesel fuel out of coal.

So if you take the burning of coal to run the Fischer-Tropsch process and you replace that with nuclear heating, the CO2 print from coal to liquids plant goes way down. What it is exactly, I'm not sure, but it goes way down.

And then the other thing about the government installation is you can sell

electricity to secondary markets so you can benefit directly the communities, as the Air Force bases or Army bases.

I will say when we looked at this for several of the areas when the Air Force came out with a request for information, New Jersey was a perfect spot to site one of these small reactors, relatively high electricity costs, McGuire had a lot of space, a large secondary market in the neighborhood. It doesn't work so well when you go to Idaho or you go down to someplace in Louisiana or Mississippi where they're paying 3 cents a kilowatt, a single module isn't as competitive as the large.

Public private partnership, I just threw this up here to say, you know, in some of the areas where you want to have sustainable nuclear power and the cost of the electricity is hydro or some other baseload power or where you need critical emissions where you have cheap power and you want to build a nuclear power plant to make sure you have sustainable power, you might need to get into some sort of loan guarantees or some

other program other than just a straight commercial.

In general, the project will work with a straight commercial financing. They're relatively inexpensive once you get through the development costs. So, again, you need to build a lot of them to amortize the development costs over several years.

We were talking about this. This is the facility in the Ohio River up in southwestern Indiana that builds heavy components. They have been doing it since the '60s, continuously building heavy nuclear components.

This is a fuel fabrication facility in Lynchburg, Virginia. It's licensed, licensed by the NRC and it was a potential site to build a nuclear fuel plant here.

This is the deployment schedule that we came up with. We're basically here. And if everything goes according to hopes, we have the few long NRC review cycles to build the first plant, but in the 2017 or 2018 time frame, just laying it out the way it is, we're

hoping to pull that back a little bit to about nine years from now.

So the benefits, at least, the way I see it, a modular reactor is really the size that the customer needs. It's not a one size fits all. How do I bite off a 1000 megawatt plant, where can I put it, how can I pay for it. If you need 250 megawatts because you have an old coal-fired station that is 60 years old and you really want to take it off line, you can build two modules on that brownfields site with the current transmission system and basically it would be a one-to-one replacement.

The competitive cost is primarily because of the short construction cycle and the shop fabrication of the components.

There is reduced risk at the site and the supply chain.

There is a shorter construction schedule. We're thinking this is going to be a three-year construction schedule on the outside. I think we can pull that in.

It will involve PWR technology, so the regulator is very familiar and comfortable

with the technology.

It has a five-year refueling cycle so the O&M costs are optimized. You don't have to be shutting down every 18 months to refuel the system.

And because it's underground and you have a really large primary cooling inventory, you have passive safety and you have a lot of benefits and safeguards and security with the facility being underground and the spent fuel being all contained.

There you go, I think I stayed under 20 minutes.

VICE CHAIR HANNA: To keep things on track, let's take two questions for Jeff and they can't both be from Jim Blando.

Jim, go ahead.

DR. BLANDO: I was curious about, you mentioned NRC with some of the new, more advanced reactor designs.

Could you just comment looking to the future, could you comment a little bit about how you see that going?

It sounds as though there has been resistance or is resistance to some of these.

MR. HALFINGER: It's interesting. When you go to the NRC, they are not resistant to doing anything. Any time you go to them, they would love to work on whatever it is you want them to work on. It's a completely -- 90 percent is fee recoverable so if you want them to work on, you know, a reactor that's fueled with mothballs, they'll be glad to look at it and figure it out, but they're going to charge you $260 every hour they're working on it.

The thing is when you go to some of the concepts, whether it's a Toshiba SSSS, that's a sodium FASS (ph) reactor that we haven't built in this country since the '50s or some of the other really advanced scientific designs, in order for them to adequately ensure that they're accomplishing our mission, which is to protect the public health and safety, it goes into what they call research so they have to understand the concept. They have to understand the science and the technology before they even develop a regulatory framework for those other technologies. It takes a long time to get through that before they even get to the

263

regulatory stage.

VICE CHAIR HANNA: Jorge.

DR. BERKOWITZ: I think I heard a very good presentation, but I think you really glossed over the waste disposal issues.

I mean, what your solution is, is to have a bunch of repositories across the country until we figure out what to do with it. Could you please comment on where you think that issue needs to go.

MR. HALFINGER: In my opinion, that's very easy. It needs to be reprocessed and you need to get the usable energy that's in used fuel turned back around and put back into the reactor system to be burned a second time.

95 percent of the energy of nuclear material is sitting in the ground after it's expelled from the reactor. So you need to develop a system, you need to take it, get the energy back out.

DR. BERKOWITZ: Could you just elaborate on that comment; 95 percent of the nuclear energy is where?

MR. HALFINGER: Of the energy

264

that's put into the fuel rod is sitting in the spent fuel.

DR. BERKOWITZ: Right.

MR. HALFINGER: You use very little of it so you need to get the energy back out, reconstitute it, put it back into the reactor and get the energy out of that material. There is a lot of energy left in spent fuel. It was a presidential directive 35 years ago to say we're not going to do that anymore. Basically, a stroke of the pen stopped that.

DR. BLANDO: Is that because of the Plutonium 239 or whatever it is that that's why reprocessing isn't so encouraged in this country?

MR. HALFINGER: There's a technology that you can use for reprocessing, co-precipitation. You can co-precipitate plutonium and uranium.

CHAIRMAN BIELORY: And it, therefore, has limited...

MR. HALFINGER: It has no bomb-grade applications.

MR. ELSTON: As a follow-up to

265

Jorge's question, assuming that none of this reprocessing would take place, how long of a storage period would you have for spent fuel

in the cell itself after it is spent, you
know, 5 percent of it was spent?
MR. HALFINGER: The lifetime of
the reactor, which is 60 years. It could stay
in there indefinitely.
MR. ELSTON: Similar to -- okay,
but do you have space in there for that type
of...
MR. HALFINGER: Yes. Because it's
such a small reactor, there is only 69 fuel
cells in the reactor so 69 times -- there is a
dozen refuelings if you do it every five years
so you have 690 fuel assemblies, which isn't
-- doesn't take up that much space.
VICE CHAIR HANNA: The last one.
MR. SPATOLA: I'm curious. What
does the management and disposal of the
nuclear waste cost; and, how much does that
impact the cost of the electricity that is
generated?
MR. HALFINGER: Right now, today
by statute in the Nuclear Regulatory

266

Commission, the spent fuel fund is one-tenth
of one cent per kilowatt; so, basically, one
mil, basically, is assessed as a tax per
kilowatt generated at a nuclear power station
and that's a charge to the utilities that is
collected by the federal government that is

supposed to ultimately decide and figure out what to do with the material.

MR. SPATOLA: And there is no solution.

MR. HALFINGER: Well, right now, the solution is storage. They were heading down the Yucca Mountain path, that looks like that is going to be at least slowed down for a long time.

There are some private companies. They've actually lifted the executive moratorium on reprocessing so there are commercial enterprises that are looking to see if they can make a commercial enterprise out of reprocessing material.

VICE CHAIR HANNA: Thanks very much, Jeff. Thanks for coming up.

(Jeff A. Halfinger was excused.)

VICE CHAIR HANNA: We are going to

talk about nuclear.

Our next speaker, Rick Mroz is a lobbyist consultant, practicing attorney. He represents -- one of his current exploits is representing a sizeable coalition of large energy users across New Jersey called, The New Jersey Energy Coalition.

He has got extensive background, experience in government affairs across all levels of government federal, state, county and local, including a past stint as chief counsel to past Governor Whitman.

Thank you for joining us Rick.

MR. MROZ: Thank you, Toby. Thank you very much for being here and since pretty much everything I was going to say has been said, I can give you the break now.

There you go now.

I am not going to read the comments. I knew that by this point in the presentations in your work today, in the deliberations that the comments that are here, they can be entered into the record, but you've heard most of what is in there.

Let me tell you first about our

268

coalition, but I must say that the title of your sessions of this program, What is the mix that's necessary to meet the carbon goals is really the point. It's the mix. You've heard today about a number of things that aren't just dealing with air quality, not just dealing with the carbon footprint or carbon consequence.

Rather, I'm reminded of some comments that I heard yesterday from Joe Kelleher (ph), who is the former chairman of the FERC, Federal Energy Regulatory

Commission that deals with interstate transmission on the federal level of gas and electricity. He said, you know, as a regulator of electricity, I came to realize that I was as much an environmental regulator, as I was an energy regulator.

Well, folks, it seems to me that what you heard today and it may be no surprise, but maybe it just hasn't hit you that you're dealing with as much about the consequences related to energy policy as you are with environmental and air quality policy issues.

269

It is pretty evident to me from the work we do with the coalition that we work with and founded two years ago, the New Jersey Energy Coalition, which is made up of 60 organizations that are active in the State of New Jersey, state-wide organizations like New Jersey SEED, New Jersey Alliance For Action, New Jersey BIA and state-wide labor organizations like the IBEW, like laborers, the AFL-CIO, all of whom are members and have been very active in the mission of the coalition to talk about these issues that are air quality issues, energy issues, environmental issues, all of which come together in the work that has come and been really spearheaded and come to fruition in the Energy Master Plan.

While the coalition has been supportive of it and in a collaborative effort with the administration worked and supported the goals that are set whether they be for energy, introduction of renewables, whether it be for conservation, whether it be for other measures, including the introduction of solar or wind power, nevertheless, a lot of our work

has been to continue to focus the discussion publicly and with policy makers that there is still this need to meet the baseload generation issues.

You heard from Joe Dominguez and Bill Levis what the large generation companies are doing, but it also strikes us that some of the decisions that need to be made are all interrelated.

When you make a decision about air quality, about carbon reductions, it has a consequence as it relates to whether companies can plan for the future to build a generation stations and if that baseload generation is still going to be important.

When you look at the EMP and the conclusions of the EMP, whether it's in the presentations that have been done by the DEP, by the Board of Public Utilities, you know, there still is at the end of the day and I will quote and from my testimony, just reiterate that after achieving a 20 percent reduction in electricity consumption, generating 10,000 gigawatts of electricity through combined heat power and using

renewable resources to produce as much as 30 percent of the remaining demand for electricity, approximately 47,800 gigawatts of our 2020 demand remains to be met by other generation sources.

There are still huge numbers that are necessary. You saw the charts from a number of presenters. New Jersey will still place in 2020, 2030, 2040 and beyond, the need for significant baseload generation assets.

Now, some of the presenters pointed out that as the companies have done, what they have been doing and should do, whether it is to repower those facilities, whether it is to upgrade those facilities, put those investments in, change over from the fuel, from the fuel mixes, less coal, nevertheless, there is still the need -- there is still the need for that baseload. And as those generation assets start to age further, those will come off line.

If today any of those generation assets that make up the baseload capacity come off line, New Jersey's economy will suffer. There will not be sufficient energy,

sufficient electricity to be competitive, to run transportation, despite the need in the future to transfer over to other fuel sources.

We think and our members think and have been very active in raising this dialogue to say that we need to be mindful of it; and that's why, here today in another policy making setting, the policy makers and stakeholders like the New Jersey Energy Coalition, environmental groups and industry need to be talking about these issues.

As you're seeing today, it's not just a New Jersey policy issue. It's one that really goes beyond the federal energy policy. In fact, the new administration in Washington has a great opportunity to forge what will be the future of that energy policy for baseload generation and for the nuclear fleet issues like those that have been mentioned, the storage of nuclear fuels that are currently stored in each of the facilities or whether it's the issues that the administration could face as to the challenges to possibly restart and to encourage the federal tax credits that

Joe Dominguez talked about, how that assists

273

the companies to plan.

These are issues that the companies as they make their investments need to see that there is some regulatory certainty. We've heard that. It's talked about in the setting of the regulated utility market regularly, but it's true of any business that needs to make these long-term investments here in New Jersey to try to determine what will be those generation assets in the future, in 20, 30, 40 and 50 years.

Nuclear facilities, if there is an intention to embrace new nuclear plants, the policy making has to start to take that into account. Those are the kinds of decisions that you, other policy makers here in New Jersey need to start to get your arms around, need to start to make those recommendations; that regulatory certainty equates to the businesses, the generation companies being comfortable that they can, in fact, make the investments that are needed for the future, that people that are looking for jobs, the trade unions that operate and work in these plants will say that it's worth

274

staying and committing to work here in New Jersey or for businesses that want to relocate to New Jersey, that the energy future is stable, the policies are clear, there is an intention to embrace that and provide a platform so that people will be willing to not only stay, but come back to New Jersey.

So regardless of the challenges of the relicensing of the existing nuclear generation facilities, which Exelon is going through right now at Oyster Creek or the challenges for the construction of possible new clean coal or clean central station plants, it's the underpinnings for this industry that there needs to be the consideration that there is a clear policy and that there is a clear regulatory setting so that companies that want to build can build, that the investments, the capital markets see a clear path and are willing to invest and support the investment construction for new generation facilities whether they be nuclear or otherwise.

Former Governor Brendan Byrne once said, If you're from New Jersey and you

275

haven't gotten something for nothing, you haven't gotten your fair share.

Well, it's not quite true because there are consequences, there are costs associated with any of the decisions we make, whether it is for reductions in carbon, which have costs associated with them, whether it has to do with the decision to embrace technologies like nuclear, there will be offsets.

These are the balances and the tradeoffs that you as policy makers, other policy makers in this state and on the federal level need to make; but the discussion and the debate needs to begin and a clear path hopefully will come from the work that you do and that other policy makers do.

So I thank you for letting me give comments today and I will be happy to answer any of your questions.

VICE CHAIR HANNA: That was great, Rick. Thank you.

Does anybody have any questions for Rick?

CHAIRMAN BIELORY: Perhaps you can

276

help answer what I think was asked before about nuclear waste. I mean, that's the -- I see that that's the bottleneck.

A comment?

MR. MROZ: A couple of comments, first, as we have not only worked with and seen both the storage areas and the issues, first of all, there is a bit -- there is a misnomer. I mean, it's characterized as nuclear waste, but really it's the storage of nuclear fuel that is not completely spent.

We talked a little bit about it. There are several ways to deal with it. One is to store the rods, as they are. The other is to do reprocessing, which essentially was shutdown back in the '70s for fear that the byproducts, the fusion process would create what is an unstable nuclear fuel for nuclear proliferation and nuclear bombs; that was the purpose of shutting it down. It can be done.

You can talk to the nuclear engineers and they say, You can take the existing stockpile of rods and without having to mine another ounce of uranium, you could have another 200, 300, 400 years of fuel from

the stockpile that is currently residing at the plant.

It is the question of how do you do it, how do you contain it; on an international and national policy level, is it worth doing and do you do it.

It could be done. It could be

done safely.

MR. SPATOLA: Nuclear waste aside, how does the nuclear energy industry provide security and safety to provide comfort to those who would be potentially impacted by these facilities?

MR. MROZ: From a terrorist event or...

MR. SPATOLA: Everyday operations in terms of regular safety releases, emissions that might occur as part of a day-to-day operation.

MR. MROZ: Right. On those, I would have to defer. I'm not the engineer. The industry folks would have to be better to answer it; but those safety considerations are all of which goes into their normal operating procedures, the licensing procedure which the

NRC oversees.

All of those issues are issues that are, in fact, monitored, are dealt with and if the Council were inclined, I would even encourage you to visit one of the several nuclear plants that are here in New Jersey. It is a tremendously enlightening event if you were inclined to do it. The people who operate these are tremendously knowledgeable, impressive people. I have been impressed from visiting the facilities. I can tell you that from firsthand knowledge.

DR. BLANDO: Just getting back to the waste issue again because I know the Council has supported, you know, use. I think it's obvious to everybody that that obviously has to be an important part of the mix, but the waste issue is one of the sort of hang-ups that us and a lot of people are having.

You know, I guess when we went down to Oyster Creek, and you can correct me if I'm wrong or clarify this for me, you know, I was under the impression from the folks that were operating that plant and I know maybe Joe Dominguez, that's a question I wanted to

279

ask him, I was left with the impression that they were sort of reaching their dry casket system; that they were sort of reaching capacity for their ability to continue storing rods on the site and they didn't know what they were going to do 15 years from now when what do we do if there is no Yucca Mountain or Yucca however you pronounce it, if that's not permitted and reprocessing isn't allowed we don't know what we're going to do.

And then further, that, you know, reprocessing, although I did hear what Jeff was saying about, you know, sort of some new processes that are out there, that even when you reprocess, while you recover some of the usable isotopes, you still have waste from the process.

So those are a couple of issues, like in my own mind, impressions that I had been left with when we went to Oyster Creek and I'm still unresolved about it.

MR. MROZ: It is an unresolved issue. There is a portion of that, that is left that could be characterized as waste that has to be stored some place in long-term

280

storage; and again, that is an issue that has to be addressed.

There are no easy answers. There's a trade-off on all these thing. There is no one answer. As a number of presenters have said, there is a balancing of issues and again coming back to not just an environmental issue, but a cost issue, a long-term policy issue. We need to get our arms around collectively, but to give some certainty as to how this can happen.

The federal government and the opportunity really is there for a federal energy policy to address and engage in the area of perhaps all of this along with all stakeholders.

MR. EGENTON: Just real quick on that note, do you think the dialogue should be open on a federal level because I understand they're able to recycle more in Europe.

MR. MROZ: True.

MR. EGENTON: That's why they are progressively ahead of us. We can't do that here in the United States. I imagine that has got to be brought up again for consideration

as we look at what do we do with the spent fuel.

MR. MROZ: It is, Mike. And it is happening overseas. It is the kind of thing that on a federal level, but even state by state we should educate ourselves to see what options there are so we can try to forge that path to a policy that makes sense.

Thank you.

VICE CHAIR HANNA: Thank you.

(Rick Mroz was excused.)

VICE CHAIR HANNA: We're going to take a seventh-inning stretch for a five-minutes. We still have a list of three really great invited speakers and a short list of public speakers, as well, so stick around.

(Recess: 3:23 p.m. to 3:32 p.m.)

VICE CHAIR HANNA: Bob Williams is a senior research scientist at Princeton

University, more specifically Princeton Environmental Institute.

His research interests span a range of topics relating to advanced energy technologies, energy strategies and energy policy.

282

Under Princeton Environmental Institute's Carbon Mitigation Initiative, Bob leads the carbon capture group. So his subject is going to be talking about what to do about coal, specifically, in New Jersey.

Bob, we are on a tight schedule so please 15, 20 minutes, if you can.

MR. WILLIAMS: I would like to thank the Clean Air Council, NJDEP for inviting me to participate in this important hearing.

I am going to be engaged in a very substantial shift of course from what you have heard most of the rest of the day. I am going to be talking about what is to be done with coal power.

The basic premise I'm starting with is that meeting greenhouse gas mitigation goals being discussed in the Administration and in Congress at the present time will require one or more of the following courses of action for existing coal-fired power

plants.
They will either have to pursue CO2 capture and storage by means of

retrofitting existing plants with so-called CO2 scrubbers or repowering such plants with something else, but saving the sites that already exist.

I will be focusing on these options here in my presentation and repowering essentially with either coal or coal plus biomass. If you don't do these, then the only alternative is really going to be to retire these plants long before industry would like to do so; okay?

To put this into perspective, I would like to call your attention to recent legislation, such as, the legislation just introduced yesterday by Representative Waxman calling for a cap and trade regime whereby U.S. CO2 emissions from fossil fuel burning in 2020 would be 20 percent below the 2005 level; that's a very daunting goal.

We don't know if that's actually going to be enacted. If it is, it has to pass Congress and -- both houses of Congress, but this is the level of the debate at the present time.

I also want to call your attention

to the fact that levels of carbon prices that we are going to need to solve the carbon problem are much higher than people realize.

The International Energy Agency in its 2008 World Energy Outlook report estimated that in order to stabilize atmospheric CO2 levels at twice the pre-industrial level, at 550 parts per million, we will need a greenhouse gas emission price in 2030 in OECD countries, that's the industrialized countries, of $90 a ton of CO2 equivalent.

And if we are to meet a target of 450 parts per million, instead of 550, which many scientists think is going to be necessary, the price has to be $180 a ton in 2030.

To put $100 a ton into perspective, that's equivalent to a gasoline tax at the pump of $1 a gallon so that's what we're really talking about here.

So what are the options available for retrofitting existing coal-fired power plants. And for the sake of argument, I'm going to focus on one large coal-fired power plant in New Jersey, which is Hudson. I'm going to show you some calculations I've done about Hudson.

The options are retrofitting with amine scrubbers; this is where you scrub the CO2 out of the stack gases, but this is quite costly, involves a huge energy penalty and it requires very high greenhouse gas emissions in order to make the technology cost effective.

The alternative is various repowering options; and that is, replacing the equipment entirely, but saving the site, including the coal-handling facilities and so on.

Among these, the least costly stand-alone power option we've already heard reference to is the coal integrated gasification combined cycle power plant with carbon capture and storage; that's the least costly stand-alone power option, but it's still very costly, as I will show you.

And the alternatives, which I am sure are not on any of your radar screens, but are not based on advanced technology, they're based on commercially ready technology are the ones I'm going to focus on here and they

involve the coproduction of liquid fuels and electricity with carbon capturing storage.

These offer the prospect of very

low CO2 capture costs because you're making synthetic fuels and most of the cost of CO2 capture is simply the cost of CO2 drying and compression so you can put it into a pipeline and send it to where you want to put it underground.

And to put that into perspective, we've already heard an allusion to the SASO (ph) plants making synfuels in South Africa. They make 144,000 barrels per day of synthetic gasoline and diesel fuel and chemicals from coal and they vent to the atmosphere a stream of pure CO2 in the amount of 20 million tons per year; that's the largest point source of CO2 emissions on the planet. It's very easy to capture that, all you have to do is compress it, put it into a pipeline and put it underground so that's why you want to think about not just electricity, but electricity plus liquid fuels.

These combined facilities offer higher energy efficiency and lower capital

costs than for any separate production facilities and they offer attractive economics for power generation at high oil prices and they, also, offer extremely low conventional pollutant emissions, such as SOx, Nox and ROx and mercury at the plant and from the ultimate burning of the synthetic fuels.

And if you add some biomass to the coal and co-process coal and biomass to make liquid fuels and electricity with CCS, you change biomass' status from what it is usually considered as a carbon-neutral feedstock to one that is carbon negative because you're putting photosynthetic CO2, underground along with the CO2 that you store underground associated with the coal.

This is a slide that I borrowed from Ted Palmer, who is Senior Vice President of Government Relations at Peabody Energy. And he represents the oil or the coal industry, which understands what I've already told you here; and that is, that carbon capture and storage for synthetic fuels production plants is commercially ready technology.

288

You can see that from this slide that Fred presented just a week ago, a few days ago in Washington, D.C. at the World Coal to Liquids 2009 Conference.

What he shows here in this slide is that they envision that commercial coal to gasoline and coal to liquids technologies with CCS are going to be commercially ready in essentially the 2012 time frame compared to post 2020 for these other technologies.

So we're not talking here about advanced technology. And in fact, there is already a CCS project underway in New Jersey. New Jersey is unique in thinking about CCS opportunities early on, even though less than 20 percent of your generation here comes from coal, compared to about 50 percent U.S. average.

What makes New Jersey unique is:

First of all, you have high electricity prices, which makes these kinds of technologies very interesting.

You also have very stringent environmental regulations for the criteria pollutants, which creates a favorable

environment for introducing gasification-based energy systems, which are much cleaner than combustion-oriented systems.

And you have favorable off-shore prospects for CO2 storage.

So this is a good place to get started. In fact, a so-called PURGeN project was proposed by a company called SCS Energy to the planning board of the City of Linden just a few days ago for a plant that they want to build at the long idle DuPont property.

This project would gasify

Pennsylvania coal to generate about 500 megawatts net and produce as coproducts some mix of hydrogen, ammonia and urea. It would use a dry cooling system for the combined cycle power system, as at its Astoria Energy Plant that had previously been built in New York. And it would capture 90 percent of the carbon in the coal as CO2 and store it in a sandstone formation 1700 meters under the sea floor at a distance 100 miles from shore where the water is about 800 meters deep and the targeted date for start-up is 2014.

I would like to suggest that if

this project goes forward, it be accompanied by one or more additional projects that are involved in repowering existing sites in New Jersey.

The system that I am going to give focused attention to in my presentation is this one here, which would gasify coal and biomass to make synthetic liquid fuels and coproduct electricity; okay?

Coproduction, as I've indicated, gives you very large energy efficiency and capital cost advantages compared to separate production of liquid fuels and electricity in separate units and biomass coal coprocessing enables you to exploit simultaneously negative greenhouse gas emission benefits of photosynthetic CO2 storage and also coal conversion scale economies.

In most parts of the country, you also benefit from the low cost of coal compared to biomass, but in New Jersey that doesn't seem to be the case because coal prices are quite high in New Jersey and coal and biomass prices are likely to be pretty comparable.

These are the options that I am going to focus on in my presentation.

The top line here is the Hudson plant, as it is. The second plant is the Hudson plant retrofitted for CCS. The third is repowered as a coal IGCC plant with carbon capture and storage. And then the last two options are repowering with a liquids plus electricity plant based on only coal and coal plus biomass.

What I am doing in all of these cases is assuming that the coal input to the plant is identical in all cases so there is no change in the rate of delivery of coal to the system so what we want to do is see if we can save this site under severe climate constraints.

What I show in the third column

here is the electricity that would be generated annually from these plants.

In most cases, if you're going to do retrofitting or repowering, you're going to reduce the net output of that plant over the year. The only exception to that is if you repower it with an IGCC power plant, but for

the other ones that I show, you see there is a significant reduction in net generation so that has to be made up by some other source, either a new coal plant with CCS or some alternative plant whether it would be wind plus compressed air energy storage or natural gas combined cycle or what have you.

Only two of these produced liquid fuels, which are the last ones. And only one of them, which is the very last one here uses some biomass, but it's less than 10 percent of the energy input to the plant is biomass, okay, so over 90 percent is still coal.

I want to call your attention to the numbers in the last column over here; okay?

The cheapest option in terms of initial capital investment is a simple retrofit. It's less than half a billion dollars; okay?

And all the other options have

about the same capital investment requirement, but it's three times as much, instead of being $.5 billion, it's about $1.5 billion.
Now, I am going to suggest that a

very plausible biomass supply in a state like New Jersey where you don't have much agricultural production, you don't have much forestry is to instead use urban wood waste.
The next graph here shows a distribution of the urban wood waste that might plausibly be available at the Hudson plant from four counties, which are Union, Hudson, Essex and Bergen. This is urban wood waste consisting mostly of residential renovation wastes, that's the one at the bottom here, next comes municipal solid waste and the next comes yard trim and the rest is a bunch of small stuff; okay?
And that's about 300,000 tons per year. And for the plant I am proposing, it would require maybe 250,000 tons per year so a significant fraction of that total biomass that might be available in the region.
This graph here, the next graph shows the greenhouse gas emission rate for all the cross-hatch options on the right are what they are, the greenhouse gas emission rate relative per megawatt hour. And the bar on

the left is what the emission rate is for

Hudson at the present time. You can see they all give you dramatic reductions in emissions relative to the plant as it is at the present time.

Next, I am going to show you a little bit about the economics of the different alternatives here. And if you're going to calculate the cost of generating electricity from a plant that has two products, you know, liquid fuels and electricity, how do you determine what the electricity generation cost is?

Well, the methodology is pretty straightforward. You take the total levelized annual cost of the plant for operating that plant, including returns to capital, all kinds of O&M costs, fuel costs and the like, you subtract off the revenues that you get from the sale of the liquid fuels, which I am assuming here is what its price will be at the refinery gate of the crude oil-derived products displaced and divide that difference by the electricity generation and that's the electricity price.

Here is what the numbers look like

if the oil price is $75 a barrel. Well, the oil price is now of the order of $50 a barrel. It was up to $150, you know, in the summer of 2008. And most forecasts are that it is going to go up if the world economy ever recovers.

Hopefully it will in, say, the post 2015 period because you're not going to get any of these plants on line before 2015. And you want to think about the levelized price of oil over that 20-year life, say, from 2015 to 2035.

I am going to show you the results for two situations, one of which is a $75 a barrel oil price, levelized oil price and the other is for $100 a ton levelized oil price.

The first graph here shows the results for a $75 a barrel oil price. And you can see that the retrofit option requires a greenhouse gas emission price of about $80 a ton. It's almost as high as what I said the OECD price has to be in 2030 so that's not something that's going to be done very soon because it will require your getting close to 2030 before you would actually do it.

I want to call your attention to

the fact that the third one down is this coal biomass coal production option here, which has a greenhouse gas emission price that is slightly less, about $73 a ton.

Now, let's go to $100 a barrel oil, which most people think is more likely in this time frame and the numbers change quite dramatically, as you can see.

A coal/biomass to liquid/electricity with CCS system, instead of requiring a greenhouse gas emission price over $70 a ton requires a greenhouse gas emission price of the order of $30 a ton and that's a price that most people think is in store for us in the 2015 to 2020 time frame. It dramatically reduces the cost of the electricity that is provided by these decarbonized electricity prices.

Now, when I put these graphs together, I had assumed that the price of the -- or the capital investment for Hudson is completely written off, okay, so that you just have to pay for the fuel costs and the operation of maintenance costs of those plants.

297

What I learned today in coming to this hearing is that they have to have recently spent several hundred million dollars on refurbishing those plants for environmental controls and so the cost ratios are not as dramatic as is indicated here because these plants really aren't written off at the present time; but nevertheless, if you're going to replace those plants soon with something else, it's a shame they have already made those same investments.

The final thing that I want to call your attention to is a proposal that I have made for what I call a CCS early action initiative that would be a joint initiative pursued by the Department of Energy and the Department of Defense.

I'm hoping that states will be interested in pursuing this idea with our federal leaders and that there is widespread agreement, there is an urgency to carry out so-called megascale integrated CCS projects.

Megascale means projects that last at least five years at commercial scale and store per project at least a million tons of

298

CO2 per year per project, at least.

At the G8 Summit in Japan in July, the G8 agreed to sponsor 20 such projects globally that would be up and running by 2016 and the U.S. committed to sponsoring 10 of those 20 projects.

The problem we face at the present

time is the question, Do the economic crisis and the budget deficits concerned jeopardize meeting that G8 goal that was set in July before any of this economic crisis transpired.

I'm going to suggest that this proposed CCS early action initiative, if it were to allow the coal production systems to compete with power-only systems for the benefits require that the synfuels be in compliance with Section 526 of the Energy Independence and Security Act of 2007 and specify that the winning projects are those with the least costs of greenhouse gas emissions avoided.

For example, as determined in reverse auctions that the government could meet these goals at very low cost. In fact, what I show in my paper on this, which I would

like to request the Council include in the record of this meeting is if the levelized oil price is more than $50 a barrel in the post 2015 time period, the net costs of these demonstrations would be essentially zero or negative.

The reason for that is that I am proposing that the Department of Energy pay for the incremental cost of carbon capture and storage over the first five years of these

projects and that the Air Force would offer
20-year procurement contracts for the
synthetic fuels. If they were to do that, the
government would come out ahead in all
likelihood because the oil price is probably
going to be a lot higher than $50 a barrel in
this period.
So to sum up or to conclude, I
would like to request that both this paper and
also a talk that I presented at the -- at
World CTL 2009 last week in Washington be
included in the record along with my remarks.
Thank you.
VICE CHAIR HANNA: Thanks, Bob.
And that link at the bottom is the

300

location for those papers?
MR. WILLIAMS: Yes. And there is
also a long paper, a long technical report
that documents all the assertions that I made
in my presentation here at the bottom, but
these other two things I left here at the
desk.
VICE CHAIR HANNA: Good; thank you
very much.
Do we have one or two questions
for Bob?
MR. MAXWELL: I have two. This
may kind of reveal how ignorant I am, but on

the first slide, you have SOx, Nox, ROx...

MR. WILLIAMS: That's particle emissions, it's a pun.

MR. MAXWELL: Oh, okay.

The other thing is with the carbon capture, they want to go down, what did you say, 800 meters and go out 100 miles to sea?

MR. WILLIAMS: First of all, if you're going to do this on land, you need to go below 800 meters below the surface. What they're planning to do over there is 1700 meters below the sea floor, where the -- this

301

is at the edge of the outer-continental shelf where they're proposing to do this where the water is already 800 meters deep.

MR. MAXWELL: Why not inject it on land?

MR. WILLIAMS: Well, these are very favorable formations out there and this is a very good place to get started. I am not sure that there are any favorable sedimentary bases in New Jersey on shore for doing geological storage. I think that's the case in most of the midwest and the Rocky Mountain regions, you can store it underground on land in the sedimentary basins; but on the east coast, those opportunities are much sparser and I think you have to go off shore.

VICE CHAIR HANNA: Thank you very much, Doctor.

(Robert Williams was excused.)

VICE CHAIR HANNA: The last section of the agenda, we are trying to put together a panel kind of back-to-back speakers on the solution side of things. We've heard a lot of solutions along the way, but these are really the policy solution areas.

302

I want to introduce the first speaker who is a Trenton icon. Hal Bozarth has been the executive director of the Chemistry Council of New Jersey for 25 years and serves as a lead advocate for the Council in the quest to make New Jersey more competitive for employers in the manufacturing sector. Much of his work has been on the energy side. He's instrumental in coordinating the coalition for competitive energy in the State and the organized member companies of the CCNJ into the largest industrial energy aggregation group in the nation.

Thanks for taking the time for us, Hal. I appreciate your being here.

MR. BOZARTH: Thank you, Toby.

Dr. Zonis, Dr. Elston, it's nice to see you both again. Thank you members of

the Clean Air Council for the invitation.
I am really impressed. You put me behind a professor from Princeton and following four energy nuclear experts that have all been giving you great presentations and wonderful options for diverse solutions to

your problems.
So having seen all that and listened to all of that, I've taken my 20 slides and put them away and I've taken my 30 pages of written testimony and will not read it to you.
I'm going to try to do something a little different and I want to put something in perspective for all of you because you may not have been hearing this. I haven't been here all day, but I also recognize that all of you have been here all day and so I will be mercifully brief if at all possible. And, John, you have the hammer, you can throw it at me when I'm over my five minutes.
I want to give you some facts, New Jersey based facts and then I want to talk to you about the situation that we in the manufacturing sectors find ourselves and then talk to you about two or three of the things that I heard prior speakers talk about that I just wanted to stop and touch base and give

you a different perspective on.

First of all, and most of these companies you won't recognize, many of them

you will, I apologize for my occasional cough.

AGC Chemicals closed their Bayonne site last year, 160 people gone.

Sunoco will lay off 20 percent of its salaried employees.

Rohm Haas will cut 900 jobs, given their merger with Dow. And after the merger is done, another 3,500 jobs will be gone.

GlaxoSmithKline expects to cut 6,000 jobs.

Dow Chemical will do worldwide 5,000 jobs cut, close 20 plants and sell several businesses.

Ashland bought Hercules, slashed at least 200 jobs, if not more.

Bristol-Myers Squibb, 3700 cuts.

Praxair, 1600 cuts.

If Merck buys Schering Plough, there will be significant cuts, all New Jersey cuts, all people who you've heard of here in the State.

Chapter 11, Lyondell Bassell, five plants in New Jersey stopped.

Chemtura, bankruptcy last week, everything has stopped, four plants in

New Jersey, who knows how many will lose their jobs.

I bring those interesting, but not directly germane facts to your vision simply because you must consider the fact that I will give you in conjunction with what I just told you. New Jersey's industrial energy rates are 60 percent above the national average now, down a little bit, it used to be 70 percent above the national average; that is, for industrial rates.

Of all sectors, we rank ninth in the nation for the highest energy rates in the country. Commercial, 35 percent above the national average. Residential, 33 percent above the national average. Total all sectors, 43 percent above the national average in the cost of electricity.

And so as you look at your alternatives and which one you should pick, put them in the context of the thousands and thousands of jobs that we've just finished hemorrhaging and the cost of energy, as it exists in New Jersey and ask yourself some basic questions:

Gee, should we do a cap and tax system and add another $100 for a kilowatt of energy?

Should we put a tax on existing carbon-based fuels, 20 cents a gallon; what do you like, John, 50 cents a gallon?

Should we worry about the economic repercussions of what we do?

I would suggest that if those of you in the leadership positions of New Jersey care about the economic viability of the State and people who depend on the tax money that is provided to you by the commercial/industrial sectors, you'll stop and think and maybe you'll join those people in Washington this past year when you say, Chief, let's look for new options here in America for new energy supplies. Maybe it's natural gas. Maybe it's off-shore oil drilling. God forbid, I bet no one talked about that today. But there is oil out there and there is a lot of natural gas not only out there, but here in a main area of America.

If we don't drill here and if we don't drill now, what you're planning on doing

307

will only increase the price. The Princeton professor said he's looking in 10 to 15 years for energy to be 150 bucks a barrel.

Think about the implications.

If you look at the business of chemistry, which would include for purposes of this talk, pharmaceuticals, flavors and fragrances and those big bad chemical companies that you've heard so vilified over the years, you would know that all of those companies are significantly energy dependent, whether they use natural gas to make their products or to heat and run their facilities or they use energy to make their processes work, we in the business of chemistry use a significant amount of energy.

In fact, the industrial sector of New Jersey, still to this day, after losing 29 percent of its employment in the last five years in New Jersey are the largest sector of the energy users in the State.

Interestingly enough, if you tracked our greenhouse gas submissions over the last ten years, we have significantly cut the emission of greenhouse gases better than

308

any sector of the country. In fact, I think our increase in ten years is 2 percent; that means we're doing an awful lot to eliminate greenhouse gases and cut them back.

The largest sector of society relative to greenhouse gas, there is a toss up between households and transportation. Households are extraordinarily inefficient. People in the business of chemistry make many products to make houses more efficient. In fact, you've probably seen the house wrap that DuPont and others sell, which for every unit of energy to produce the plastic sheet that goes around your house as they put your new house up, assuming anyone ever buys new houses in New Jersey again, saves 360 units of energy so you can see the amount of energy that is lost.

And so I am trying to pull this all together and say if you take an industry which has cut its greenhouse gas emissions, which is a high-energy intensive user and you add costs on top of it because you believe we ought to cap and tax for the purpose of reducing greenhouse gas emissions, you will

have the blood letting of the manufacturing and the commercial sector like nothing we've seen in the last year.

Some would say, Oh, we're a service economy. What I am here to tell you and as Dr. Zonis can tell you is that if, as a society, we do not make things and take a raw material, add value to it, intellectual or whatever and create something worth a profit, we will not create wealth. If we do not create wealth, those people who rely on New Jersey's high standard of living will be looking for business somewhere in Mexico because their standard of living will be about where we are in New Jersey.

So when you say to me, We need to find alternatives, I say to you, Drill here, drill now. It's real simple. Let's look at ways we can identify those alternative sources of energy and not put our manufacturing businesses at risk.

Here is the point I want to make. I'll move away from that. Thanks for a moment of propaganda.

If you say to yourself we as a

nation must do cap and trade or cap and tax, as I talked about it, ask yourself, will that make a difference and then talk to the Princeton professors and say, If we in America did everything in a cap and trade situation and let's say the certificates are worth 100 bucks, that will decimate our business economy, but that's okay, what will happen to the overall greenhouse gas fuel and again, I'm not here to tell you that I'm a Princeton professor that knows real answers from a scientific point of view, I'm nothing but a poor struggling lobbyist, but I will tell you unless China and India do the same or more and stunt their own economy, we will have no impact on the overall savior of the globe.

And I ask you this, Why would India and China and developing nations say, Okay, America, you do it and then we'll do it. I'm here to tell you, that's just not human nature. It's not going to happen. China will not say to its people, You are destined to pull a wheelbarrow for the rest of your days. They will not do it. They will try to be as we are, an industrialized society.

311

I am saying to you, don't cripple our industrial capability to compete on a worldwide level because the other people will not. They just are not going to do it.

I guess that's my second propaganda piece so I would ask you to think about that.

And then my friends from the monopoly energy suppliers, better known as utilities, they like to tell you, if you listen to their talk, about all the good things they're going to do for green industry and green jobs and they're going to cut their production of carbon-based production of energy, but if you listened to the gentleman, I forget who he was, he said, So we're going to have to look at what we're going to do with the rates and we're going to have to look at decoupling of rates and he went on for five more paragraphs.

I need you to understand what decoupling of rates means. It means that the old way of monopolies charging ratepayers rates and money to buy their process will be gone. It used to be that a unit of energy

cost a dollar and if you bought 100, you'd pay $100. The monopoly will be happy. It gets a guaranteed rate of return on its investment and it goes on and does what it wants.

Under decoupling, the monopoly would say to you all, the ratepayer, Oh, by the way, we're going to take some of your rates and we're going to provide for green jobs so that we have less use for the old kind of energy, but now we're only going to sell you 90 units of energy because now we've got wind power. But then the monopoly says to you, Oh, by the way, the rate that you paid for 100 units, you're going to have to pay that now, we're going to decouple our rates from actually giving you something that we produced that you bought; that's not the American way. It didn't work in Eastern

Russia. It didn't work in Eastern Europe. You pay for what you get. We should not be subsidizing the investor-owned monopolies with our rates when our rates are this high.

I think my time is probably close to up. And now Kenny Esser gets to follow me so I'm sandwiched between a Princeton

professor and the guy who is running the energy policy for the State of New Jersey so I'm going to cede some time to Ken, but I will ask for questions if you have any.

VICE CHAIR HANNA: Let me jump in there, Hal.

Short of the cap and trade or cap and tax, as you call it, and I heard your recommendation, I think we heard it loud and clear, what about electric generation?

What are you advocating there; obviously, we need power, but what is it?

MR. BOZARTH: Right, and I cut a lot of my stuff out because I know that you've been here for a long time.

We believe in a panoply of energy alternatives and additions. We think there is space for a bit of wind. We think solar has some place to be. There has to be some diversity in supply, but Mroz made the point; and that is, we need new and more baseloaded

generation. I personally prefer nuclear
because not only is it the cheapest energy to
produce, it's also the cleanest.
So if you care about clean air,

314

Dr. O'Sullivan, and if you care about people
who get sick because of bad and not clean air,
maybe we ought to think about doing something
positive for the environment and doing like
France did and say, Let's build some nuclear
plants. They must have solved the storage
problem and they did. They don't have the
storage problem that you folks are questioning
about.
So I think we need new baseload
generation. I'd like to believe in coal
sequestration, but I can't say it so I don't
know, but new baseload. Frankly, we're not
going to get away from coal. We're not going
to get away from oil, not in our lifetimes,
not while I have hair.
CHAIRMAN BIELORY: I don't want to
comment about how much hair you will have,
but --
MR. BOZARTH: Thank you.
CHAIRMAN BIELORY: -- I'm talking
about the future, New Jersey's future.
MR. BOZARTH: I am, too.
CHAIRMAN BIELORY: I can

understand about the economics of it and that

we have to take that into play; however, as a physician, you know, the future of our grandchildren is at an abeyance now.

MR. BOZARTH: And mine, too.

CHAIRMAN BIELORY: I agree, but you haven't given me the future concept; you've given me the now concept.

MR. BOZARTH: Right and I wanted to give you the now concept because everyone else has talked about the future, but more nuclear, more fossil-fuel development, better environmental protection from those sources.

I think we need to do something with transportation, obviously. We need to do something with retrofitting houses. President Obama has probably got a decent point there. I'm not sure I want to pay for your house to be retrofitted, but that's another story.

The bottom line is we can't just stop today and say, What we have done for 100 years is wrong and so let's throw it out and let's start again.

We are not going to get off coal. There is no way the cap and tax program is going to work in Congress because of the coal states. They're too strong. They're too powerful. So I'm saying, since they're cheap, let's find a way to use that as a mix of the energy we need for the future. Maybe there will be something that happens in 40 years, a new technology will be able to help us. But in the meantime, nuclear, coal and, oh, by the way, let's drill for some more natural gas, very cheap, very clean and it's abundant out there, but we won't drill because there are competing people out there who say, You really can't drill here, you can't drill now.

Here is the thing, and I'll leave you with one story, Doctor. This is interesting.

When we did the energy deregulation eight or nine years ago, I put together a pretty good coalition. It was people like citizens action and PERG (ph), some large energy users and some senior groups. And I went to a place not far from here in Mercer County and got three or four groups of senior citizens who live in senior communities, all in two-bedroom houses, maybe six rooms total, all on slabs and all on

317

electric heat, sold a bill of goods by the

monopolies years ago that everything would be
nuclear and "too cheap to meter" was the
phrase they bought under.
As the winter months went on,
those people on fixed incomes -- and the
prices were not nearly as high as they are
now -- would shut off the heat in one of their
bedrooms or two of their rooms and live in
only two because they couldn't afford their
energy rates. And that was nine years ago,
that was not today after the $150 oil shock,
that was not in the future with $100
certificates for cap and tax.
What are those people going to do;
what will you tell them in the future?
Oh, well, freeze. Close your
other room up because you can't afford it?
Sorry. Thank you very much. It
was a pleasure.
(Hal Bozarth was excused.)
VICE CHAIR HANNA: All right.
Kenny, I think you already got
your introduction.
Kenny is joining us from the

318

Governor's office. Kenny is the Chief Energy
Advisor to Governor Corzine. And to say
you've been working recently with the BPU on
the Energy Master Plan is probably drastically

understating the role you've taken; but join us, you've got the final say, I think, for the most part.

MR. ESSER: All right.

VICE CHAIR HANNA: So tell us how we can get this right and we'll certainly listen and then ask questions.

MR. ESSER: I will tell you what I'll do. I am going to try to keep it brief, but give you a brief overview of our current actions and the Energy Master Plan and hopefully just allow some time at the end for your questions, whatever they may be.

So in October of last year, the Governor released his Energy Master Plan. I think it took about two years in the making, but we came up with the Energy Master Plan that we think is a combination of aggressive goals and targets and acceptance of the reality of the situation we're dealing with and an exception of or accepting of the

319

limited authority that the State has to meet the challenges that we face.

The challenges that we are looking to address in the Energy Master Plan are really three. It's one of reliability. It's one of affordability of energy prices. And that's always been the role of the regulator the energy regulator. And then we add the third one, which is greenhouse gas emissions.

How can we improve the reliability of the systems, the affordability of energy supply and reduce greenhouse gas emissions?

In the Energy Master Plan, we made a decision that none of those three need to be mutually exclusive. Of the solutions we outlined, about five with different goals accompanied with about 25 different action items to get there.

The first one being energy efficiency, reducing projected demand for electricity by 20 percent by 2020.

Now, I will tell you today, we would probably need to take a step back and relook at those numbers with the economy the way it's going. Actually, we've seen energy

320

consumption start to fall off. We may need to relook at those numbers since we last ran them in September and the economy has changed so dramatically.

In order to get to that target, we're looking at really three action items to get there.

One, building code legislation to encourage more energy efficient building.

Two, more efficient appliance

standards. So that way we're going out and
buying the latest, greatest whatever,
refrigerator, that there are incentives in
place and that there are mechanisms in place
that push people to buy the more efficient
refrigerator.
And then last, and I think this is
the most important, is how in New Jersey do
you reach into 3.7 million buildings between
now and 2020 to get the energy savings that we
need.
At the end of the day, we weighed
our options, we've been pushing forward the
clean energy program and we made the
conclusion that we need the electric and gas

321

utilities to be in the business to help us
with the access and implementation of getting
energy efficiency in each of those 3.7 million
buildings in New Jersey between now and 2020.
Is the answer to that decoupling?
I'm not sure.
What I am sure of, though, is that
under the current business model that
utilities operate under, in that the more
energy they sell, the more money they make,
that's obviously contradictory to what we're
asking them to do for energy efficiency so
whether the answer is decoupling or not, I am

not here to have that answer for you.

What I am here to say is we're working closely with both of the utility groups, stakeholder groups, the Chamber of Commerce, BIA, Hal Bozarth's group. Everybody is trying to come up with what the right solution is to get the utility companies in the game.

Again, I'm not convinced that the utilities' involvement in energy efficiency is mutually exclusive to keeping rates low and achieving our energy efficiency targets.

Next is demand response.

We want to reduce the peak demand for electricity. And this is probably more important than the energy efficiency goal.

If we're going to tackle emissions, if we're going to tackle the high price of electricity, we've got to tackle the problem of the incredibly high and peaking amount of generation, during, you know, let's say, 3:00 p.m. on a summer day; that's the time when most generators are turning on, that's the time when the most expensive generators are turning on.

We have got to find a way to market signals, whether it be on meter side or through rates to encourage people to think twice about turning their dishwasher on at 3:00 p.m., instead of 3:00 a.m.; so we've got to change behavior.

This is kind of where the reality is in this plan. We're not saying we have all the answers to that. All we're saying is we've got to look at the options. We've got to explore different metering technologies, different rate structures in order to get us

323

the desired behavioral change that we're looking for. In many respects, this is going to be a psychology experiment as much as it's going to be anything else.

Next and probably the sexiest of all the stuff is renewable energy. We initially had a goal of 20 percent by 2020, renewables by 2020. It was actually 22.5 percent when you factor in class 2 renewables.

But what happened as we progressed with the plan, we saw an ability to increase our off-shore wind goals. We initially had a goal of 1000 megawatts by 2020. We saw based on cost estimates and what it will do to rates, based on estimates of what we can actually harness from our off-shore resources, we saw the opportunity to go from 1000 megawatts by 2020 to 3000 megawatts by 2020.

In addition, we saw the

opportunity to have a separate carve out of 900 megawatts of biofuel.

When we factored those things in with what we projected to happen with energy consumption based on all these other activities, we ended up stumbling on the

324

number of 30 percent by 2020. We saw what we could do with renewables. We saw what we could do with demand. We put the numbers together and at the end of the day, we saw that by 2020 it is very realistic for New Jersey to have 30 percent of its energy supply coming from renewable energy ideally generated from within New Jersey by 2020.

On the off-shore wind side, I also say that we've already moved forward with three developers to start to commence work on the first 1000 megawatts of off-shore wind that we hope to be in place by the end of 2012, the beginning of 2013.

What we've done is we've provided about $12 million in rebates from the BPU to support the meteorological tower development that will be necessary for these projects to take the next step.

We're also looking at other incentives we can do. We are kind of using the solar model of carve outs within our

renewable portfolio standard to ensure that
we're going to hit those targets for off-shore
wind.

The solar, we made a couple of
changes. Those are mostly nuance, basically,
just to make sure that as we drive down energy
consumption, if we're operating with a
percentage -- if a percentage was our goal for
2020 for solar and we're driving down energy
consumption, well then you're also driving
down your solar goal, that's not what we
wanted, that's not how the solar goal was set.
It was set because we identified a number and
then we fixed a percentage to it so we kind of
separated that out and fixed that glitch, if
you will.

The next part -- and this is the
section that I'll say is mostly buying time.
I think renewable energy offers us a lot of
solutions going forward to address a lot of
the problems.

We have a hope that going forward
the solar technology, the wind technology,
especially when it's coupled with energy
storage technology, which we remain, you know,
confident that they'll mature, those offer
great solutions. We think the price of those
are going to come down.

Energy efficiency, demand response, those are just good practices that are going to change people's behavior, change the way they think about energy.

At the end of the day, this is still not going to keep the lights on. This is still not going to meet the affordability of the system that we are looking for.

In order to kind of make up that gap that we're left with, we made some tough decisions. We said, We want about 15 megawatts of increased cogeneration capacity, that's about a 50 percent increase from where we are today.

Yesterday, the Governor signed a bill that will -- the retail margin fund bill, which will supply about a $450 rebate per kilowatt of installed capacity for new cogeneration.

In addition, we said, If somebody wants to come in and install a liquefied natural gas terminal off the coast of New Jersey, that so long as it meets the highest environmental standards as articulated by the DEP that that is something we would support because it's going to supply additional natural gas supplies into the New Jersey system, which is only going to either drive down costs or at the very least increase the reliability of our natural gas supplies in the State.

And on the nuclear question, the nuclear question, I'll kind of go back to our demand response. We didn't answer it. But we didn't not answer it for political reasons. We didn't answer it because we didn't feel like we had enough information, especially in the downturn of the economy, I'm not sure what it is going to take to get a new nuclear plant going.

Instead, what we said is we're going to put together a task force and they're going to look at a few very critical pieces of information.

What is the baseload demand doing in New Jersey?

We always talk about baseload demand. It's really cheap energy. And it is cheap by -- basically, by definition. It's running all the time. If it wasn't cheap, we

328

would have an enormous problem.

You can't say, We need more baseload supply. You have to look at whether or not we have baseload demand. They're going to be competing in the PJM marketplace. If they can't get their product on line at PJM because there is not the demand at 3:00 in the morning to support them, then it doesn't make sense to move forward.

So we said to the task force, go look at the baseload demand curves, see what you see, see what is out there currently in PJM. Already about 50 percent of New Jersey's energy comes from nuclear energy, see how much more room there is for that.

I know that the other nuclear developers that are weighing -- pursuing nuclear in New Jersey are looking at the very same thing right now. And I think you haven't seen any announcements in that area because of the economy and because of the uncertainty as to what that baseload demand is going to be.

Two, what is going to happen with the storage of the waste coming out of it; that's a question a little bit more for

329

Washington in that I'm not sure New Jersey is going to come up with a solution for that.

I think that's something we need to work with Washington to figure out what are we going to do with the waste.

Is the national policy to store it

on site; or, is there going to be some sort of national site that we store this waste?

We don't know the answer to that. Hopefully, over the next year, we can get that answer and it will provide us with some additional clarity.

And so I say that these things are buying us time. Energy efficiency in a way is also just buying us time because at the end of the day there is still greenhouse gas emissions, significant greenhouse gas emissions associated with the generation that is going to be keeping our lights on.

At the end of the day, we're still increasing our demand for natural gas, which is also, obviously, going to have greenhouse gas emissions associated with it.

We are buying us time for the science community to help us come up with the

330

additional silver bullet that will be necessary to address the challenges that we face here today. 30 percent renewables is just not enough to fully address the ultimate challenges that we're facing.

Our ultimate goal is providing a reliable energy supply, affordable energy supply, but an energy supply that is completely environmentally neutral. We can definitely get there. We can't get there by 2020. Let's be realistic. But we have to, at least, know that that's where we're going and be realistic that these solutions here are not solutions, but merely just items that are buying us time.

The transportation sector, you haven't heard me talk a lot about that. For the most part, our transportation plans have been very focused through the DEP's greenhouse gas report. We're looking at things such as a low-carbon fuel standard. We're looking at ways to encourage electric vehicles to take hold, smarter planning, etc.

At the end of the day though, New Jersey is not going to come up with a

331

solution there for the transportation. It's going to be a national solution, whether we go to electric vehicles or hydrogen or some other technology.

What we have to do is put New Jersey in a place where we're limiting our vehicle miles travelled in the meantime, encouraging people to buy more efficient vehicles and setting ourselves up that when that additional technology is selected, you know, whether we go Blue Ray (ph) or we go the other direction, you know, that New Jersey is primed to be able to take advantage of that and move forward aggressively with implementation.

So I am going to stop there and answer any questions, but all the items together that I listed and I left a lot of the detail out, but together they will save consumers about $30 billion between 2010 and 2020; 2010 being the time we think we'll really get these efforts ramped up; that will create about 20,000 jobs in New Jersey.

In terms of energy savings, actually, it's $6.5 billion in 2020 if you

want some specifics. And in terms of greenhouse gas emissions, we'll move in this sector of greenhouse gas emissions to 23 percent below our 1990 levels by 2020.

So we think we have a plan here in the Energy Master Plan that isn't choosing between the environment and the economy. We no longer think that the options to those things necessarily needs to be mutually exclusive. We think we have found a way to both create jobs, lower people's bills while at the same time driving down greenhouse gas emissions.

Thank you.

VICE CHAIR HANNA: Questions

anyone?
CHAIRMAN BIELORY: I guess I'm going to play Devil's advocate. It doesn't reflect my personal views.
When you say that we're going to provide incentives for solutions, just in general, why don't we partner; meaning, it's been -- just hearing the past speaker, Hal Bozarth, reflecting that it's on the backs of the taxpayers that we're providing personal

investors or companies to expand upon that.
Why don't we partner with them and give them that money, but actually get returns on the future, not only for the general citizens, but for the treasury?
MR. ESSER: Well, I think we are partnering. I think when you heard me talk about demand response, I mean, that's going to be a partnership. I mean, that's a partnership with citizens to try to get them to change their behavior. We're not footing that bill 100 percent; that's going to be a partnership.
On the renewable energy side, maybe I should have mentioned this, but the 1000 megawatts that are going to built, that's going to be about $4.5 billion of investment. We're putting in $12 million with an M so we

are partnering and we're leveraging our funds.

The thing that has frustrated us is that through our clean energy fund, we have provided a ton of incentives, rebates, grants, loans, etc., to encourage people to do energy efficiency. I don't know if energy prices just aren't high enough for the large

population here in New Jersey. I'm not sure what the answer is, but people aren't taking advantage of them.

So we need a more proactive way to get into everybody's home and get the energy efficiency improvements done.

Is the utility, you know, the best answer?

No, I mean, but if somebody has a better answer, I'd love to hear it, but we're not willing to gamble with not meeting that target of 3.7 million homes by 2020; instead we see an opportunity to put an NC (ph) in charge of hitting all those homes, reducing that energy consumption and the consumer showing a willingness to let the utility company in the home, compared to letting the State in the home.

It's an unfortunate reality we work with; but again, as I said in the beginning, we have to work within, you know,

both the aggressive targets and the reality of
our current situation, so...
MR. SPATOLA: How does the
30 percent goal for 2020, the number

30 percent, how did you arrive at that number?
Was it the input from technical
people who actually looked at technology and
what is realizable or just numbers that were
just posted up there that these are goals we
should obtain without considering the
realizability of that being possible.
MR. ESSER: Let's start with where
we were.
Our renewable portfolio standard
that is in place today is -- it is at
22.5 percent by 2020. Of that, 20 percent
Class 1 renewables, solar, wind, etc.; 2.5
percent Class 2, which include other, you
know, operations, some waste energy
technologies like the incinerators and stuff
fall into that category of that 2.5 percent so
we are already at 22.5 percent.
Within that, you carved it down
and your solar goal was about 1800 megawatts
of solar by 2020 and that was within the Class
1 carve out.
So what we did is we went back and
we looked at the buckets. And we saw that for

solar, let's -- let's keep it the same. There

is no reason to increase that right now, let's just make sure that we stay committed to that goal. In off-shore wind, we had this goal of 1000 megawatts by 2020 and looking at both the rate impacts -- and we worked through Rutgers on this to do all the economic modeling on this. I think Hughes & Seneca (ph) are the ones that did the economic modeling for that.

They looked at that and they showed us the rate impact. And I don't remember what it was right now, but it's pennies a year for the ratepayers. And then -- literally.

And then we also worked with Rutgers, their science arm, working through the Center for Energy, Environment and Economic Policy. I'm not sure I got that all right, but contracted with the technical people to look at the wind data that we had off shore to start making the estimate and the land area that would be necessary. And we saw that, do you know what, 3000 megawatts is entirely doable. It's doable from, you know, a logistical standpoint of connecting to the grid and the amount of ocean area you're going to need to cover and the technologies that are out there and it's doable from a rate impact so we increased that goal to 3000.

On the biofuel side, we took a recommendation from a report that was done about, I don't know, I guess, now it might be going on two years, that Rutgers Commission going through what the biofuel stock is in the State. We looked at that and we said, Do you know what, we think there is an opportunity here for 900 megawatts.

So we took these additional targets and we added them up and then we went back and looked at what we were doing to the energy demand, through our reductions in energy efficiency activities, etc., how we were driving down that demand.

And all we did, there is nothing scientific, we kind of overlaid the two. We did not anticipate getting to this 30 percent number. We said, Okay, if we're doing this much with renewables and this is where we want the energy demand to be in 2020, you know, we kind of stumbled upon it. We stumbled upon that number of 30 percent and that's how we

338

got that number. There is nothing scientific about it.

There is scientific analysis done on the renewable side. There is analysis done by economic experts on the efficiency side and at the end of the day it ended up just working.

MR. ELSTON: I just want to compare your comments with Hal Bozarth's for a second because this is a solution type of a session we have here.

You talked quite a bit about partnering and that was buying time, if I can use your terms, and studying plans and incrementalizing as you go along, if we choose this 30 percent.

Hal Bozarth on the other hand was -- and I'll use his terms again -- drill, baby, drill.

MR. ESSER: Right.

MR. ELSTON: And perhaps use a carbon tax, which New Jersey already has a cap and trade program.

MR. ESSER: Yes.

MR. ELSTON: And also build some

339

nuclear plants around here quickly, presumably.

And I'm asking the question because unless Hal Bozarth is using hyperbole

to a certain degree, he probably is to a
certain degree, and maybe you're not, it's
pretty hard to partner those positions because
they're extremely opposite; and yet, he is
correct in saying that we're losing a large
segment of our manufacturing industry and it
makes a lot of sense on that end.
              How can we from a policy
perspective, and forget the technical
specifics, bring about some of these broad
issues so that we can work together so that
the common people, the lay people out there
can understand and say, Yeah, it's a good idea
and I believe the government has a good idea
and I believe the chemical industry has a good
idea and I think we can work together.
              MR. ESSER: I don't think the
answer to that is compromising on everything.
I think the answer to that is how we reach our
decisions.
              Hal Bozarth and I may disagree

340

about what's in the Energy Master Plan and may
disagree about off-shore wind, but what I
would argue we wouldn't disagree about is
that, you know, if he has a concern that we
haven't given him the opportunity to voice his
case to us and make his case to us.
              And so if we take this input and

we don't make decisions within black boxes, which we've always tried to avoid, I think we can come up with solutions that are, again, realistic, but at the same time aggressive.

You mentioned and Hal mentioned off-shore drilling. He also mentioned nuclear. Well, on off-shore drilling, actually, Secretary Salzar (ph) is coming here on Monday down in Atlantic City to have a hearing on energy usage on the outer-continental shelf.

And you know, our position on that hasn't changed in that we remain uncertain as to how that makes sense with a broader energy vision as trying to push out carbon-intensive practices and bring in renewable energy technology, especially since this stuff isn't going to be coming on the market any time in

341

the next couple of years. This is a ten-year out project.

So if you're telling me that in 2020 we're going to need to be increasing our capacity for natural gas when EIA (ph) tells us there is a limited supply out there, particularly, off the coast of New Jersey, you know, that to me just doesn't make any sense.

On the nuclear side, yeah, like we said in the beginning, it's something that could make sense, but you can't build a nuclear plant quickly; that's another ten-year proposition.

So now you're talking about solutions that can't even be made available to us, can't even impact the reliability or affordability of our system until 2020.

And so I don't know, I would hope that by 2020, we have a few more of those, maybe not all of them, but a few more of those silver bullets between now and then that can help to address the many energy challenges that we are facing, energy storage, a new transportation fuel, advancements in renewable energy technology, continued utilization of

342

distributed generation.

I think these things together can take the pressure off of drilling of the OCS and take pressure off maybe massive expansions of nuclear energy and hopefully provide us with solutions that are more consistent with the direction that we need to be taking our energy policy in.

VICE CHAIR HANNA: Thank you, Kenny. Thank you very much. We appreciate your time today.

MR. ESSER: Thank you.

(Kenny Esser was excused.)

VICE CHAIR HANNA: Folks, that concludes our session of invited speakers. We do have a couple of cancellations on our public speakers, but is Mike Kennedy here, as well?

MR. KENNEDY: Yes, I am.

Good afternoon, ladies and gentlemen. My name is Michael W. Kennedy and I am a resident of Normandy Beach, which is in Ocean County, New Jersey.

This is the first presentation I've ever done other than to my local board,

343

which is Brick Township and there I'm dealing with just the town people, not as much education as in this room.

What I have heard today from Kenny and from Joe earlier is that wind power is part of the answer and that's why I'm here. Essentially, I'm looking at a situation where -- and it's been now my experience and that's why I'm really here today is that as everybody is getting their handouts, I've run into a couple of roadblocks in this small wind energy program. The roadblocks are really regulation.

No. 1, we have a local regulation in Brick Township where there isn't any ordinances. And if you flip to the last stapled copy of your format, it has the municipal ordinances that were prepared by New Jersey Clean Energy. And I see from the speakers today that Mike Winka was here. He drafted or he assisted in drafting this.

MR. EGENTON: He couldn't make it.

MR. KENNEDY: Oh, he couldn't make it and I wasn't here earlier myself.

He assisted in drafting this

municipal ordinance which was then circulated amongst all the municipalities within the State and I believe there is 566 municipalities. Unfortunately, very few have actually enacted them. Brick Township did enact an ordinance, but it dealt with commercial wind use, you know, a big tall tower. Ocean Gate enacted one. And I have Ocean Gate's here, I didn't make it part of the package, but they adopted theirs in the year 2007. And they've attempted to install the unit and they ran into the same problem I did and that is that the regulations here at the DEP require that we pay for a permit.

In contacting the DEP representatives, I explained to them my situation where I'm looking to install what I'm about to show you, and it's attached in your handout, a small wind energy system that is 30 feet in height. It's a 2 foot radius or a 4 foot diameter and it just swivels, okay, it just blows in the wind. It's a big flag pole. It's shorter than the houses in the surrounding area, all the building requirements are essentially 35 foot height

restrictions. This is well within the building requirements.

Unfortunately, the DEP requires I come to them to get a permit to install this. And in contacting the DEP, I have several names, I don't wish to use them here today, but I was told today that, No, Mike it's not a general permit, which by the way costs $600, you have to go for an individual permit so write us a check for $3500 plus a percentage of the installment.

Ladies and gentlemen, this unit costs $4500. I've heard people talk today about affordability. This is an affordable solution for the homeowner. I want to install this unit in my yard. I've been told by the manufacturer and I did the testing in my yard, it will actually generate 3 kilowatts of energy. I can put in a $4500 system and it will generate 3 kilowatts. It will pay for my electric bill. I have five or six other neighbors similarly interested.

I go downtown and I said, Give me the permit. They say, Uh-huh, we don't have an ordinance for that because we haven't

adopted what Mr. Winka said. I am now presenting that to them, as well. And I spoke to them previously and I hope to hear from them today. I am asking them to adopt the ordinance that Mr. Winka prepared with the help of others.

My purpose in coming here today is that as that top page shows you, I prepared a letter to the commissioner, Mr. Mauriello, which was faxed to him and I also faxed one to Governor Corzine's office explaining my plight. And it's a financial plight.

In New Jersey, luckily we have a lot of wind along our coast. I have plenty of shingles blown off my house to prove it. I have adequate wind energy and I can't tap into it because the cost for the regulations, i.e., the DEP permit cost and then my township costs far exceed the cost of the unit. I mean, the DEP permit alone costs what it would cost me to buy the unit.

In my township, without this ordinance, I have to go and apply for a variance, a use variance. They want a check for $2500 just for me to fill out the application and submit it to them, let alone the engineering reports, let alone the surveyors, let alone the testimony, the public hearings, etc., etc., I'm looking at a $25,000 project to put in a $4500 system.

Now, I've run small businesses my entire life. I run a law practice and have so for 12 or 14 years and before that I was a painting contractor and before that I was a landscaper. I have run the numbers. This is a doable business. This will create jobs in the State of New Jersey.

My projections, although I don't have Rutgers to run the economic figures for me, but I'm looking at between 50 to 250 employees right off the bat to begin installing these units.

My calculations are that I could sell 50 of these a week, which are 2500 a year, multiply that by 10 years, I've got 250,000 units out there times 3 kilowatts. I'm almost at 1 megawatt or however they refer to it. I don't have the education in this area, but I'm close to that 1 mega unit that they're saying the off-shore units are going to be using or developing.

On top of it, I'm creating tons of jobs. It has moveable parts. It's going to need maintenance. More maintenance, more jobs.

The manufacture says we have got a warranty for five years on this. Of course, the technology is going to get better. Of course, the engineers are going to improve the system. But in five years, that rotor is going to break and it's going to need a new rotor. Now I've got more guys going in to fix it, of course, just to replace the rotor hopefully.

Still, at this particular stage in the development, I can't even put one in my yard to show Brick Township how it works because of the inordinate expense related to just the process of getting the DEP permit.

When I spoke to the DEP, they said, Well, Mike, you know, it's in the drafting stage. We're drafting a small wind energy system permit by rule and it will be done in about two years. So come back and see us in two years or write a check for $3500.

349

Now, ladies and gentlemen, it's not a viable business if I've got to write a check for $3500 to get a permit from DEP. If

I don't get the ordinance passed in Brick, it's not a viable economic option.

The Department of Environmental Protection is here to protect our environment. It's prohibiting me from doing just that. So what I am asking here today is that you consider my comments. My letter is self-explanatory that I wrote to Commissioner Mauriello.

Why does it need to take two years to get a permit by rule drafted for a small wind energy system. You can simply limit it by the amount of kilowatts that it puts out. Obviously, if a unit is putting out 3 kilowatts, it ain't that much energy, but you multiply that by 250,000 units over a ten-year period and you've got something to look at.

In order to even get to this point, it would be very easy to separate these small wind energy systems from the large ones just by the output. And to have to wait two years, folks, is just an exorbitant amount of

350

time for something I could start next month. I wanted to have this installed in my yard for March. I have five other neighbors willing to sign on to this, but I can't do it.

What I wanted to show you is a demonstration because the manufacturer sent this to me. And I'm not here on their behalf. I am here on my own behalf.

This is the unit.

It has concrete footing. It goes up 10 feet to the rotor and then it has 20 feet of wings that are made out of airplane aluminum material. The whole unit from base to top weighs 600 pounds. Three big guys can pick this up.

And having a finance background and having run businesses, I ran projection numbers and I figure five guys, five days, five units to install. I'm looking at 50 to 500 jobs from the point when I start the business until the end of the year, sales willing and that's not including guys that are going to have to go back and do maintenance, guys that are going to have to put the unit together when it comes shipped in a box. So

351

I'm looking at adding jobs here.

One of the other things I would just like to bring to the committee's attention is that, as Kenny was saying, how do we get into the households to help the homeowners choose the right things. This is the answer. You're there. You're putting in the unit. These people are energy conscious. By the way, install these light bulbs. Take these old ones out and put these in. It's my understanding that light bulbs have a lot of energy drain in them and if you use these energy efficient ones, it will decrease your energy consumption by quite a bit just be replacing the light bulbs.

So clearly if I'm in the business of selling and installing these things and I want to make an impact on the homeowner, I'm replacing the bulbs for them because I want their bills to go down. I want them to be happy customers. I want the next job at their neighbor's house.

Once again, I'm asking that having not presented anything to anybody before coming here today, I would ask the committee

352

to assist me in helping getting these DEP fees reduced; and the second thing is to perhaps ask the State to mandate that the municipalities adopt some type of an ordinance for a small wind energy system because it's quite burdensome for a guy like me to go to 556 municipalities with Mr. Winka's draft ordinance and say, Adopt this so I really need some help, but I think that this is a viable project and a viable energy solution.

Thank you for your time.

VICE CHAIR HANNA: Thank you very

much, Michael.

MR. THOMAN: Just a clarification, what is the physical size of this?

MR. KENNEDY: The physical size from footing to top is 30 feet. The first 10 feet is the stanchion so that nobody can touch it. It's a safety issue.

MR. THOMAN: I happen to live in the same town as you.

MR. KENNEDY: Oh, okay.

MR. THOMAN: I'm curious, the reason for the ordinance, is it because of the height of what you're installing or because it

353

produces electricity?

MR. KENNEDY: No because they have nothing in place for this. They call it an accessory structure, unless you attach it to your house so they need to adopt an ordinance because there is nothing in their ordinances now that allows this type of use.

MR. EGENTON: As a follow-up to that, so you're not going from municipality to municipality trying to get it done at the local level, we have a representative here representing the League of Municipalities.

Have you tried to reach out to the League to coordinate like sort of a...

MR. KENNEDY: I'm a grass roots

guy.
MR. EGENTON: Honestly, that's my suggestion because again, you know, entrepreneurship, I'm the State Chamber of Commerce, I think that's great, No. 1; No. 2, we're the Clean Air Council, it meets goals of clean air; No. 3 if it is bureaucratic slash, you know, trying to do a model ordinance which probably could be done, I would think legislatively, the League of Municipalities

and/or another group of the Conference of Mayors I think would be interested in hearing your spiel and trying to get you up a couple of notches in the system, as opposed to your trying to do it piecemeal, municipality by municipality. I would highly encourage that you reach out to the League.
MS. MOUNT: I will help you with that, but I think there is a larger issue than you brought up to this group, that no matter what you look at, whether it's solar panels or wind things or whatever, there are going to be land use issues on what people are allowed to do in their backyards or front yards or whatever. So for this council, there is a larger issue about how to deal with that.
In our town, we had to pass an ordinance because to put a solar panel on

originally, the fees were 10 percent of the cost of the solar panel; whereas, it would cost you $200 for a new oil burner or it would cost you thousands for solar. So we had to redo that whole thing and now it has gone down so it's the same price as an oil burner. So the towns are coming around to it, but people

355

like you who are a little before the curve, we have to uncover these kinds of issues.

MR. KENNEDY: I've gone up and down the coastal region where I live. The municipalities are willing to listen, but the first question is where is one that I can go look at. There is one in DC; that's the only place that somebody was able to install it. It was part of a wind energy symposium show and this is one of the units that are there.

MS. MOUNT: Well, I'll put one in the front of town hall and then they'll...

CHAIRMAN BIELORY: Put a flag on it and they probably would have no problem.

MR. ELSTON: The Council had a year ago, I believe, had some testimony from an organization who offered services to small organizations and companies to demonstrate their products and to help them through the process of working through the State government.

What was it, NJCAP New Jersey?
UNIDENTIFIED SPEAKER: Yes.
MR. ELSTON: Is that a viable way for an inventor to work their way through or

will they know the ordinances?
They provided information to us and Maria Praeki (ph) was the executive director and she was very adept. It was her job to go out and look for products such as yours and to come up and try to move them into commerce and to see that they're successful. I think this is a good idea.
CHAIRMAN BIELORY: It's not his product. It already exists.
MR. ELSTON: Right, she does a service, though a management service to help you through the issue.
MR. KENNEDY: I hope it doesn't cost anything.
CHAIRMAN BIELORY: Just notify the township you want to put in a flag pole and that's it.
MR. KENNEDY: I approached it that way, but DEP said you need a general permit for that. The DEP said give me $600 for a flag pole; $3500, if you want to dress it up.
CHAIRMAN BIELORY: I have a house in Bradley Beach or my parents have. I

understand the concept. I do understand land

use and there are visual issues; but, again, well taken. I think it should be taken under advisement that there is some personal, I think you called it, small unit concepts that need to be -- behavior modification has to start at home and that's a very important feature.

MR. KENNEDY: The problem right now is these small energy wind systems are falling into the big windmill ones in Atlantic City.

CHAIRMAN BIELORY: Nobody has addressed it yet.

MR. KENNEDY: It is insurmountable.

CHAIRMAN BIELORY: It is not insurmountable.

MR. ZONIS: You're just being impatient. We ask you to wait until 2020 and you'll be part of the 30 percent...

VICE CHAIR HANNA: When the lights go out, you can turn one on.

(Mike Kennedy was excused.)

VICE CHAIR HANNA: Thank you very much. I'm asking for a motion to adjourn.

The docket is still open.

Do we have anybody else in the public who wishes to testify?

DR. BLANDO: Did you want to say something?

MR. VAN CAMPER (ph): I think I would like to quickly say something about the Governor supporting L&G (ph).

CHAIRMAN BIELORY: Could you state your name and where you're from?

MR. VAN CAMPER (ph): My name is Bob Van Camper. I come from Brick even though I don't know Mike.

The proposal for L&G (ph) constitute building one permanent island, one floating island and another pipe pickup system off the coast of New Jersey.

This has not been done in the open ocean before so how can there be environmental regulations that, you know, cover these circumstances?

And it's in the end just creating more reliability on foreign fossil fuel, which is more -- well, leaving our country and going to the same friendly people that we get our

oil from now. It's a situation we have to get away from. I think the only thing that is ever really going to lower costs is competition. And by competition, I don't mean more gas companies or more oil companies, I mean, more types of energy and that is what the Governor, in particular, should be looking to back, developing, call it the Manhattan project, alternative energy sources to get us away from these problems.

VICE CHAIR HANNA: Thank you.

(Robert Van Camper (ph) was excused.)

VICE CHAIR HANNA: Go ahead, Bill.

MR. O'SULLIVAN: I'm Bill O'Sullivan. I'm with the Department of Environmental Protection. I just want to thank the Council again for a wonderful hearing.

I keep telling you it's the best hearing yet, but you always seem to top yourself, at least, in my reign here as your director. Truly this has been the best hearing that I've had the pleasure to be the director for.

360

You actually got Hal Bozarth to come from West State Street up to East State Street. I haven't seen him in this building in years so that is quite an accomplishment right there. I expect your recommendations to be both courageous and carefully considered and I look forward to getting those in the months to come so thanks again.

VICE CHAIR HANNA: Thank you.

For those that are still left, we do have a written comment period that is still open.

Sonia, what is that?

MS. EVANS: April 30th.

VICE CHAIR HANNA: Open to the end of the month.

Thank you all.

(Whereupon, a motion to adjourn was made and seconded and the public hearing was concluded at 5:00 p.m.)

361

C E R T I F I C A T E

I, ELLEN MARIE GUMPEL, a Certified Shorthand Reporter, Registered Professional Reporter, Certified Realtime Reporter and Notary Public of the States of New York and New Jersey, do hereby certify the foregoing to be a true and accurate transcript of my original stenographic notes taken at the time and place hereinbefore set forth.

ELLEN MARIE GUMPEL, C.C.R., R.P.R., C.R.R.

Dated: